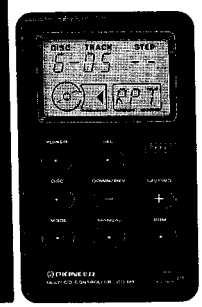
PIONEER®
The future of sound and vision.

Service Manual



ORDER NO.
CRT 1186

MULTI-PLAY CD CONTROLLER

CD-M1 UC, EW

Note :
CD-M1 will not operate by itself.
To check its operation, connect to a multi-play CD player (CDX-M100) and a cassette deck equipped with an external input.

CONTENTS

1. PLAYING COMPACT DISCS 1
2. CONNECTION 2
3. USING PROGRAM PLAY 3
4. CIRCUIT DESCRIPTION 5
5. ADJUSTMENT 7
6. SCHEMATIC CIRCUIT DIAGRAM 12
7. CONNECTION DIAGRAM 14
8. EXPLODED VIEW 16
9. ELECTRICAL PARTS LIST 19
10. PACKING METHOD 21

SPECIFICATIONS

Power source ..... 14.4 V DC (10.8 – 15.6 V allowable)
Grounding system ..... Negative type
Dimensions (hideaway unit) ..... 111 (W) × 30 (H) × 80 (D) mm
[4-3/8 (W) × 1-1/8 (H) × 3-1/8 (D) in.]
(controller) ..... 66 (W) × 106 (H) × 16 (D) mm
[2-5/8 (W) × 4-1/8 (H) × 5/8 (D) in.]
Weight (hideaway unit, Controller) ..... 0.5 kg (1.1lbs.)
Output voltage ..... 250 mV(1kHz, 0dB)
Output impedance ..... 2 kΩ

These specifications were determined and are presented in accordance with specification standards established by the Ad Hoc Committe of Car Stereo Manufacturers.

Note:
Specifications and the design are subject to possible modification without notice due to improvements.

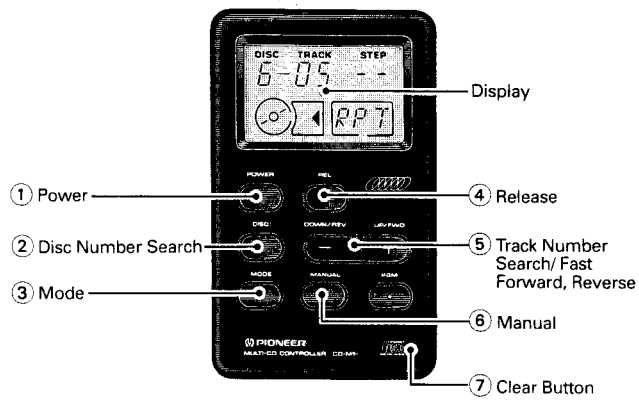
PIONEER ELECTRONIC CORPORATION 4-1, Meguro 1-Chome, Meguro-ku, Tokyo 153, Japan
PIONEER ELECTRONICS SERVICE INC. P.O. Box 1760, Long Beach, California 90801 U.S.A.
PIONEER ELECTRONICS OF CANADA, INC. 505 Cochrane Drive, Markham, Ontario L3R 8E3 Canada
PIONEER ELECTRONIC [EUROPE] N.V. Keetberglaan 1, 2740 Beveren, Belgium
PIONEER ELECTRONICS AUSTRALIA PTY. LTD. 178-184 Boundary Road, Braeside, Victoria 3195, Australia TEL: [03] 580-9911

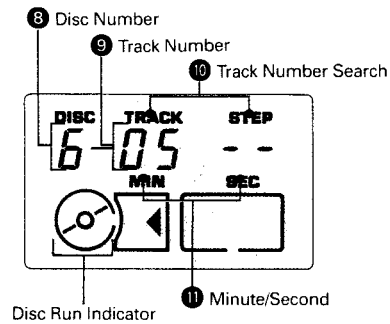
© PIONEER ELECTRONIC CORPORATION 1988

FD DEC. 1988 Printed in Japan

D-M1

1. PLAYING COMPACT DISCS





Using the Clear button

Once all wiring is complete, press button ⑦ with a thin, pointed object. Though not a normal occurrence, the microprocessor which controls the operation of this unit can be affected by electrostatic noise. This generally is indicated by such symptoms as no power being supplied when you switch the unit on, failure of the buttons and controls, or an abnormal display. Should this happen, press button ⑦ with a thin, pointed object to reset the microprocessor.

- Turn the cassette deck power switch or the tuner power switch to the OFF position.

1 Press button ① to switch power ON and begin disc play.

2 Use the Disc Number Search function to select a disc.

Press button ② to select the desired disc number.
The disc number is displayed at ❽.

- If a magazine tray contains no disc, the disc number is not displayed.

3 Use Track Number Search to select a track.

Confirm that **"TRACK STEP"** is shown at position ❾ on the display. If not, press button ⑥. Press the (+) side of button ⑤ to increase the number at position ❾, or the (–) side to decrease the number. Holding either side of button ⑤ down changes the track number at high speed.

4 Set the volume, balance, bass and treble to the desired level using the cassette deck controls.

5 To stop disc play, press button ①.

You can restart disc play from the beginning of the track at which play was stopped by pressing button ①. (UC)

Note:

- After you press button ②, it may take some time before play begins due to the time necessary to load and set the disc in the mechanism.
- The display counts down the number of seconds between tracks if the spacing is rather large (–'02, –'01).

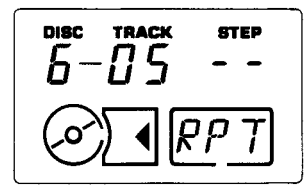
Using Music Repeat and Random Play

The display changes as follows with each press of button ③:
RPT indicator→RDM indicator→OFF

Music Repeat

This function lets you listen to a track as many times as you wish.

1. While the track you want to repeat is playing, press button ③ so that **"RPT"** is shown on the display. Now the track will repeat until the Music Repeat function is cancelled.



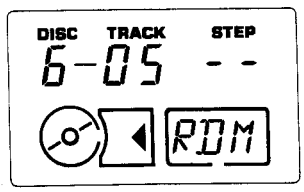
2. To cancel Music Repeat, press button ④.

- When Music Repeat is no operational, the compact discs contained in the magazine will play sequentially from beginning to end, and then start from disc 1 again.

Random Play

This function uses a built-in microprocessor to randomly select tracks from the current disc for playback.

1. While a disc is playing, press button ③ so that **"RDM"** is shown on the display. Once play of the current track is complete, the microprocessor will randomly select the next track.

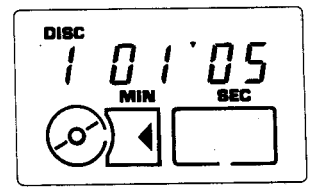


2. To cancel Random Play, press button ④.

- Random Play will only select tracks on the disc that is currently playing.
- Since tracks are selected at random, it is possible that the same track may be played twice in succession.

Using Fast Forward and Reverse

1. While a disc is playing, press button ⑥ so that **"MIN SEC"** is shown at position ⓫ on the display. At this time the display will show the amount of elapsed disc play time.

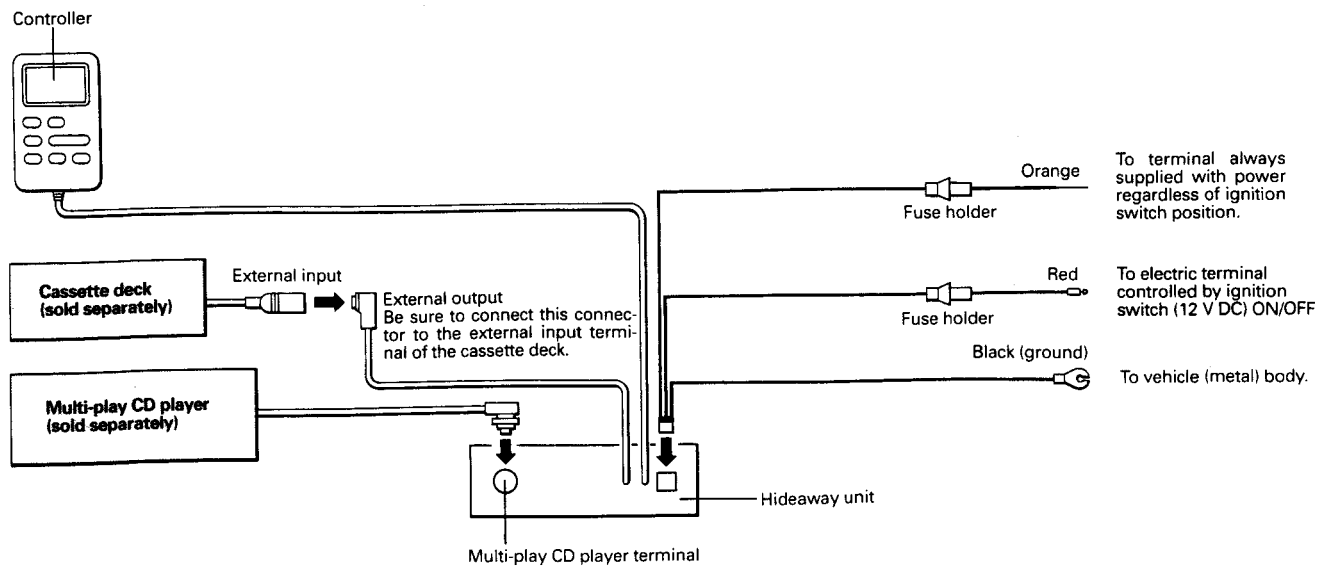


2. Press the (+) side of button ⑤ for fast forward, and the (–) side for reverse.

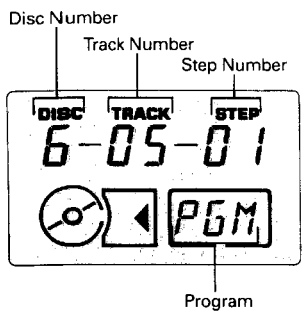
- Sound is output during fast forward and reverse operations.

2. CONNECTION

- Before making final connections, make temporary connections then operate the unit to check for any connecting cord problems.
- Refer to the owner's manual for details on connecting the various cords of the cassette deck and other units then make connections correctly.
- Be sure to connect the memory power supply lead (orange) to a terminal that is always supplied with power regardless of the vehicle's ignition switch position. If this connection is made incorrectly or is forgotten, the unit will not work at all.
- Don't pass that orange lead through a hole into the engine compartment to connect to the battery. This will damage the lead insulation and cause a very dangerous short.
- Immediately after the multi-play CD player is connected to the system, it may not operate properly (i.e. te system will not enter the multi-play CD player mode when you press the power button). In this case, press the clear button of the main unit and the clear button of the multi-play CD player, and attempt operation again.


Controller
Orange
Fuse holder
To terminal always supplied with power regardless of ignition switch position.
Red
Fuse holder
To electric terminal controlled by ignition switch (12 V DC) ON/OFF
Black (ground)
To vehicle (metal) body.
Cassette deck (sold separately)
External input
External output
Be sure to connect this connector to the external input terminal of the cassette deck.
Multi-play CD player (sold separately)
Hideaway unit
Multi-play CD player terminal

3. USING PROGRAM PLAY



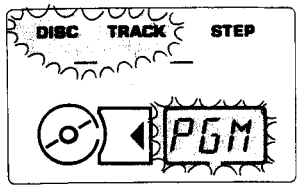
This function lets you program the play sequence of all of the tracks contained on the compact discs loaded in the magazine.

- Up to 32 selections can be programmed for a single magazine.
- Up to 16 different magazines (max. 32 selections per magazine) can be programmed individually. If you program more than 16 magazines, old programs are automatically replaced by new ones.
- Automatic Magazine Program Selection (AMPS) retrieves the right program from the memory automatically, as soon as a preprogrammed magazine is loaded. Preprogrammed magazines are identified using the CD in the tray 1 of the magazine. Therefore be sure that tray 1 contains a disc.
- The procedures for programming and changes must be performed within ten seconds after you press a button (while **"DISC—TRACK"** and **"PGM"** are flashing on the display). If you take longer than 10 seconds, you must start the procedure from the beginning again.

Programming and Playback

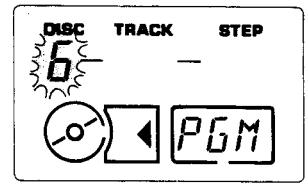
Example: Program the first step for play to track 5 on disc 6.

1. While a disc is playing, press button ④.

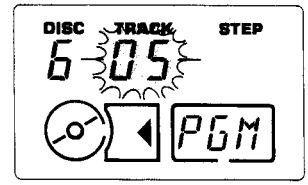


"DISC—TRACK" and **"PGM"** flash.

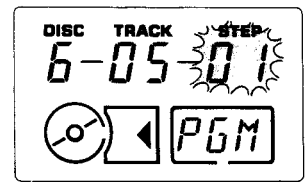
2. Press button ① repeatedly until the disc number becomes **"6"**.



3. Use button ③ (+/–) to set the track number to **"05"**.

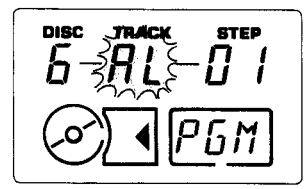


4. Press button ④ to complete one programming step.



Indicates **"Step 1"**.

- Procedure 2, 3 and 4 above can be repeated until a maximum of 32 steps are programmed.
- Pressing button ④ after selecting a disc in procedure 2 above programs all of the tracks contained on the selected disc for playback.



"AL" indicates all tracks.

5. Once programming is complete, press button ② to begin play in the sequence contained in memory.
6. To cancel Program Play, press button ② again. To resume Program play, press button ④ followed by button ② within ten seconds.

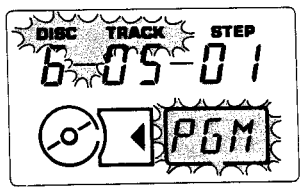
- Program Play returns to the first step in the programmed sequence when it reaches the end of the program.
- Pressing button ③ during programmed play makes it possible to search for a specific step number from among the programmed selections.

Modifying a program

Use the following procedure to make changes in a program that has already been stored in memory.

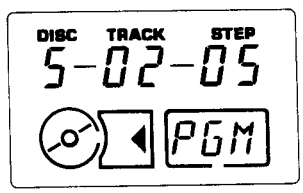
Example: Change the step 5 to track 7 on disc 3.

1. While a disc is playing, press button ④ and **"Step 1"** of the program will appear on the display.



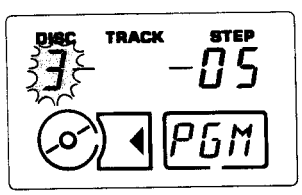
"DISC—TRACK" and **"PGM"** flash.

2. Press button ④ until **"Step 5"** is displayed.

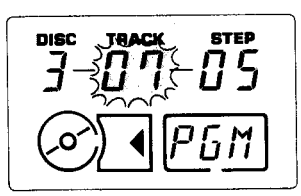


"Step 5" display.

3. Press button ① repeatedly until the disc number becomes **"3"**.



4. Use button ③ (+/–) to set the track number to **"07"**.

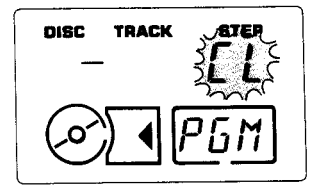


5. Press button ④. Now step 5 contains the newly programmed data, and the display shows **"Step 6"**.
   - Procedures 2, 3, 4 and 5 above can be repeated to modify multiple steps.
6. Press button ②. The program is modified, and playing begins.

Deleting a Program

Using the following sequence to delete the entire program for a magazine.

1. While a disc is playing, hold down button ④ for at least two seconds.
   When **"CL"** appears on the dispslay, the entire program has been deleted.



2. When you release button ④ after deleting a program. **"DISC—TRACK"** and **"PGM"** will be flashing on the display. You will be able to enter a new program by beginning input within ten seconds. Otherwise, a normal display appears.
   - The track playing when you delete the program continues to play after the deletion, followed by other tracks in their normal (unprogrammed) sequence.

Precautions

- If there is no magazine in the CD player, the ⊙◁OFF indication appears on the controller display. Load a magazine.
- An Err (error) indicator is shown on the display and operation of the system becomes impossible when there are no discs in the magazine or when the discs are loaded into the magazine with their labels facing upwards. Whenever this message appears, remove the disc magazine and check the discs.
- The indicator HHHH appears on the display and playback is automatically cut when the temperature around the multi-play CD player becomes too high. This protects the laser mechanism from serious damage. Listen to the tape until the temperature returns to normal.
- To assure proper operation of the unit, keep the vehicle interior temperature within a normal range using the vehicle's air conditioner or heater.
- When replacing fuses, be sure to use only fuses of the capacity prescribed on the fuse holder.
- When driving your vehicle, be sure to keep the volume of the unit set low enough to allow you to hear sounds coming from outside.

4. CIRCUIT DESCRIPTION

DATA COMMUNICATIONS

• Basic System Configuration

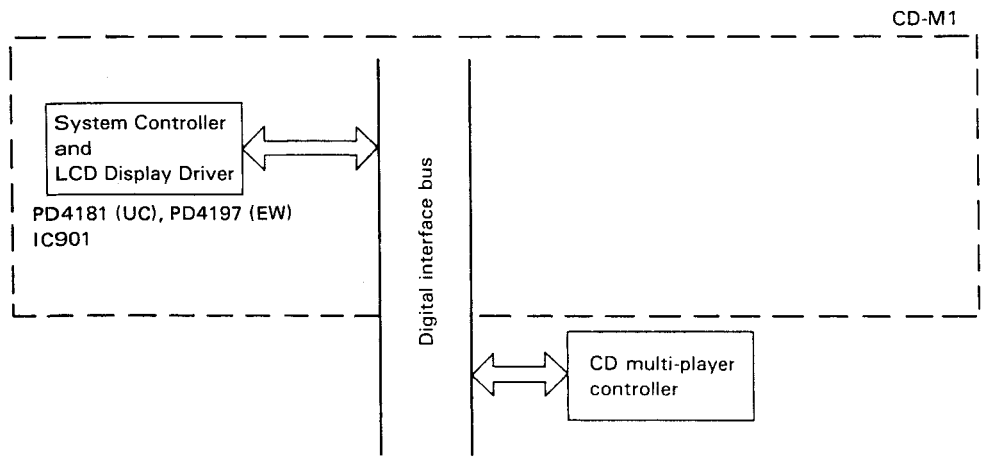


Fig. 1

• Data Bus Line

The data bus lines include the following five lines - BSCK, BDATA, BRXEN, $\overline{\text{BSRQ}}$, and $\overline{\text{BRST}}$.

BSCK ——— Synchronizing shift clock line

BDATA ——— Data line
Data synchronized with shift clock when placed on this line

BRXEN ——— Reception enable/disable signal line
The decision to enable or disable transmission of data from the transmitting end is conveyed via this line.
H (High impedance) --- Reception enabled
L --- Reception disabled

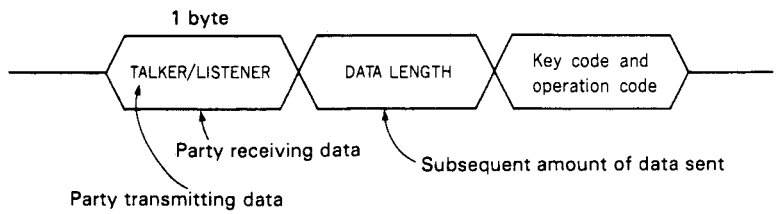
$\overline{\text{BSRQ}}$ ——— Service request line
Request master for serial poll access.
H (High impedance) --- No service request
L --- Service request

$\overline{\text{BRST}}$ ——— System reset line
Start of initialization including memory contents clearing when hardware reset executed. Communications initialization where memory contents are maintained when interface is cleared.

• Data Format

a) Master → Slave

CD MULTI-PLAYER



b) Slave → Master

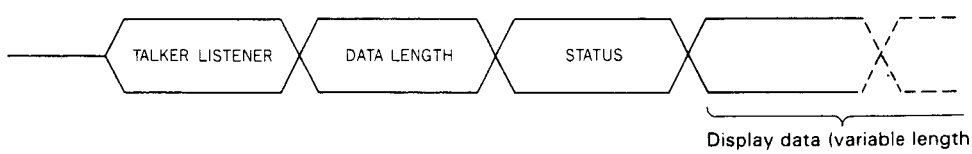


Fig. 2

• Communication Timing Chart

Example: Master → Slave

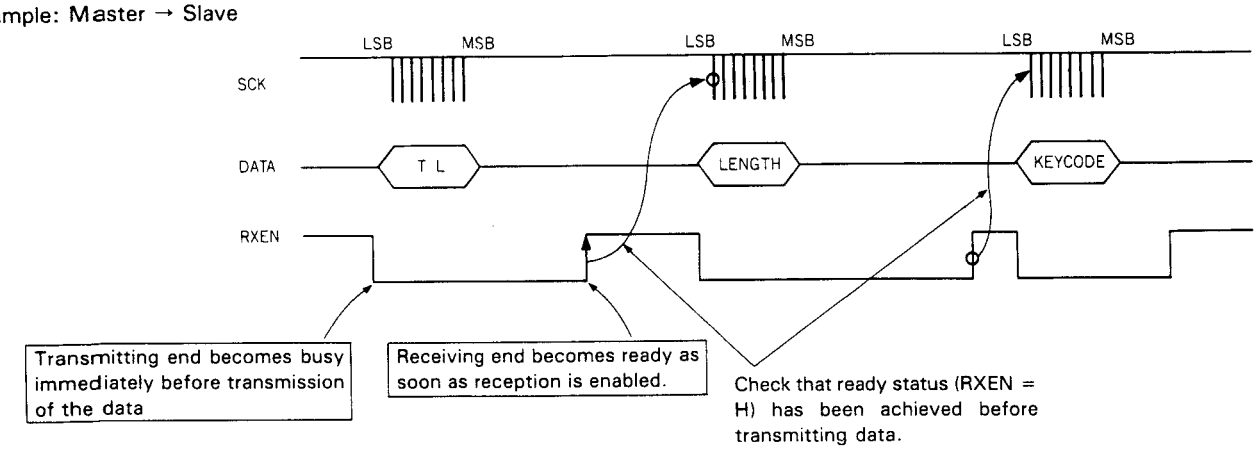
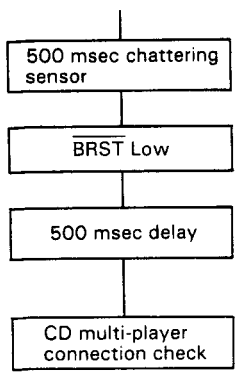


Fig. 3

• Operation (System controller operation)

a) Operation when ACC is ON



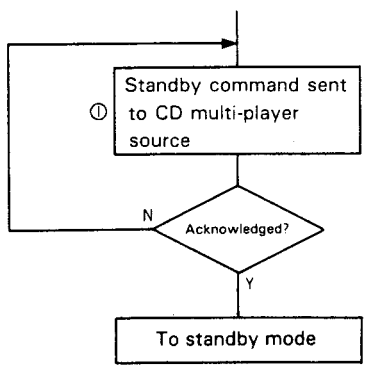
: 500 msec chattering sensing when ACC is switched ON

: $\overline{\text{BRST}}$ kept low for 60 msec in respect to CD multi-player

: Hardware reset or IFC judged by CD multi-player during this delay

: CD multi-player enquiry made by system. Valid connection assumed if enquiry is acknowledged (ACK) within 200 msec.

b) Operation when ACC is OFF



: Standby command (0FFH) first sent to CD multi-player.

: If not acknowledged, standby command sent to source ① until acknowledged. When acknowledged, source ① is put into standby mode.

: After checking that standby commands form CD multi-player sources have been acknowledged, the system controller is switched to standby mode.

c) Serial polling when BSRQ is low

When transfer of display data from slave source to system controller is desired, BSRQ is set to low at the slave source. When the system controller detects this low SRQ state, polling is CD multi-player.

5. ADJUSTMENT

1 TEST MODE

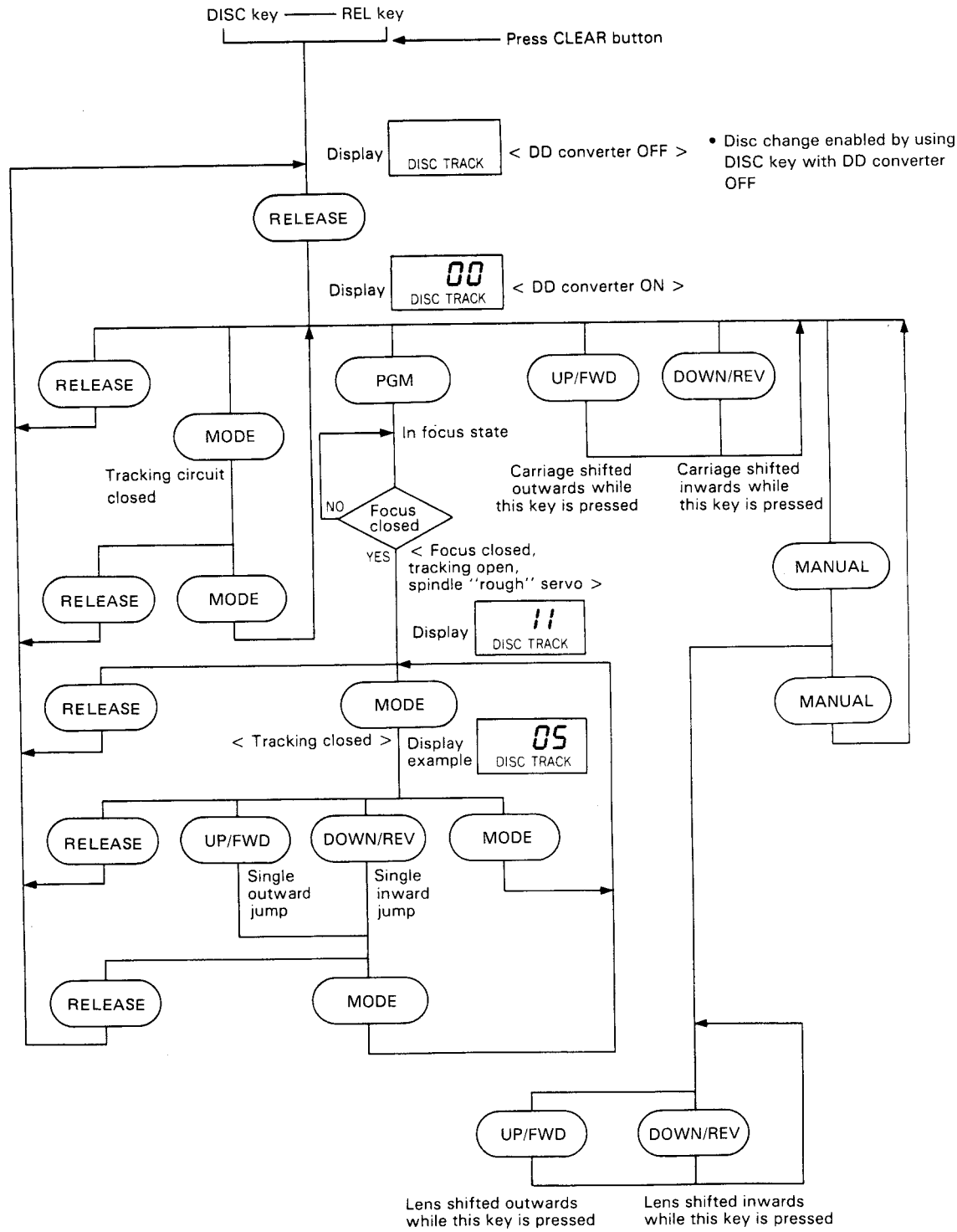
Test mode is mainly used in adjustment of CD multi-players (such as CDX-M100).

- Switching to test mode
  While pressing the DISC key, REL keys together, switch the back-up ON or release the clear button.
- Canceling test mode
  Press the CD multi-player clear button, and then the CD-M1 clear button. Or, switch the CD multi-player and CD-M1 back-up OFF.
- Key functions during test mode

a) CD multi-player

Key	Function
REL	DD converter ON/OFF
UP/FWD	FWD kick
DOWN/REV	REV kick
MANUAL	Carriage/tracking switching
MODE	Tracking close/OPEN switching
PGM	Focus close

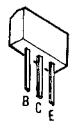
• Flow Chart


DISC key
REL key
Press CLEAR button
Display
DISC TRACK
< DD converter OFF >
• Disc change enabled by using DISC key with DD converter OFF
RELEASE
Display
00
DISC TRACK
< DD converter ON >
RELEASE
PGM
UP/FWD
DOWN/REV
MODE
In focus state
Tracking circuit closed
Carriage shifted outwards while this key is pressed
Carriage shifted inwards while this key is pressed
NO
Focus closed
YES
< Focus closed, tracking open, spindle "rough" servo >
MANUAL
RELEASE
MODE
Display
11
DISC TRACK
RELEASE
MODE
MANUAL
< Tracking closed >
Display example
05
DISC TRACK
RELEASE
UP/FWD
DOWN/REV
MODE
Single outward jump
Single inward jump
RELEASE
MODE
UP/FWD
DOWN/REV
Lens shifted outwards while this key is pressed
Lens shifted inwards while this key is pressed

• ICs and Transistors

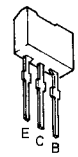
2SC2458

2SC3673

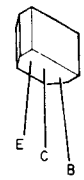


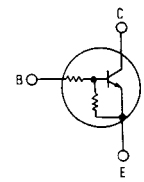
2SC3421

2SB1243

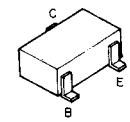


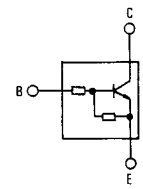
DTC114ES



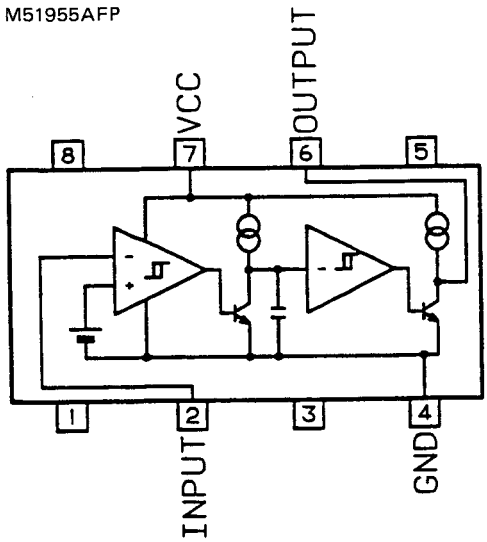


UN2211

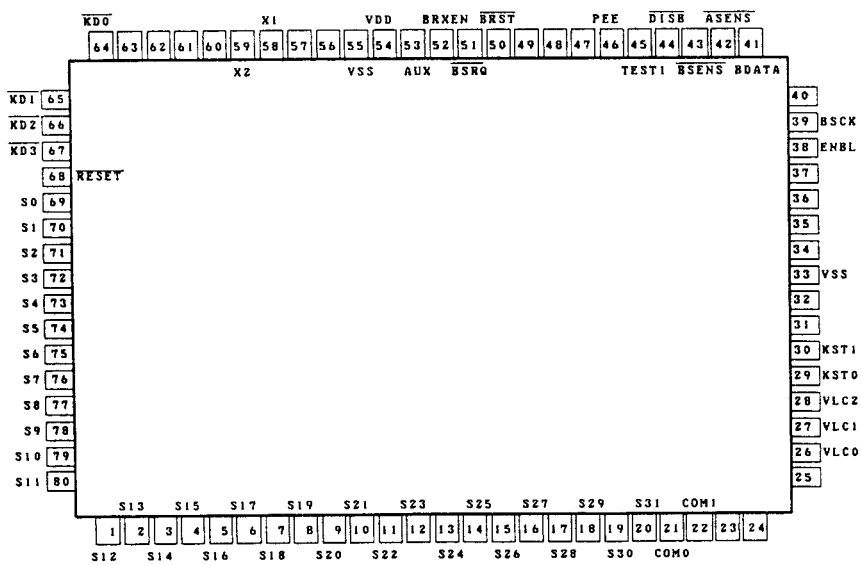




M51955AFP



PD4181, PD4197



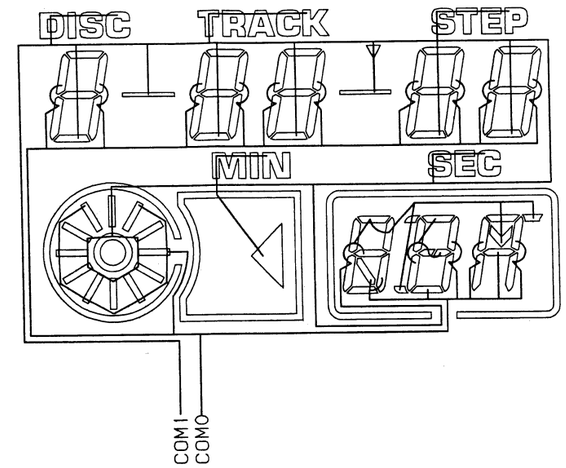
Output format	Meaning
N	N channel open drain
C	C-MOS

• Pin Function (PD4181, PD4197)

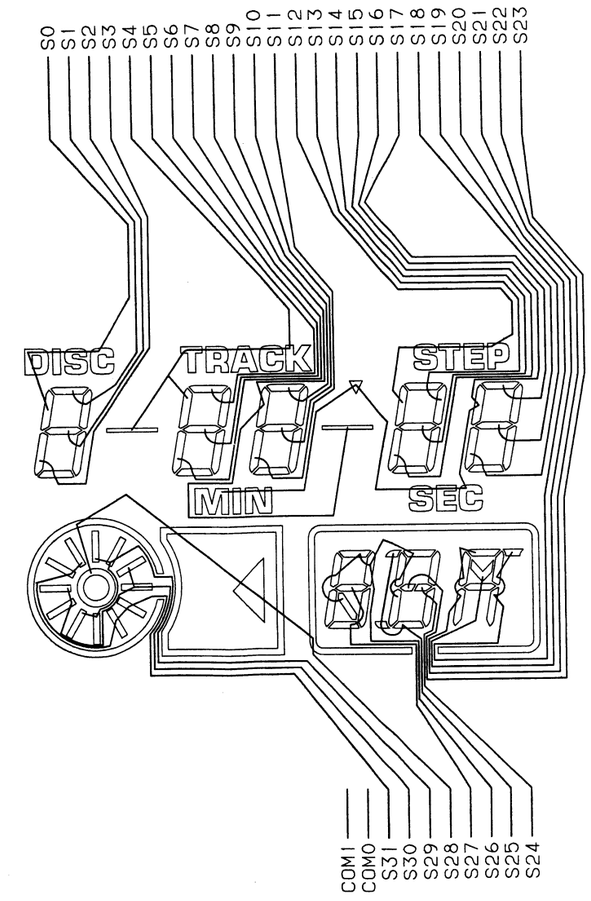
Pin No.	Pin Name	I/O	Output Format	Function and Operation
1 ~ 20 69 ~ 80	S12 ~ S31 S0 ~ S11	Output	C	Segment signal output terminal to LCD.
21	COM0	Output	C	Common signal terminal to LCD.
22	COM1			
23 – 25	NC			
26 ~ 28	VLC0 ~ VLC2			Not used.
29	KST0	Output	N	Key return signal source output.
30	KST1			
31, 32	NC			
33, 55	VSS			Ground terminal.
34 – 37	NC			
38	ENBL	Input		Not used.
39	BSCK	Input/ Output	C	System control microcomputer communications – clock input/output
40	NC			
41	BDATA	Input/ Output	N	System control microcomputer communications – data input/output
42	$\overline{\text{ASENS}}$	Input		ACC power supply sensor – H when ACC OFF
43	$\overline{\text{BSENS}}$	Input		Back-up power supply sensor – H if back-up power level drops
44	$\overline{\text{DISB}}$	Input		DISB input sensor – H when DISB OFF
45	TEST 1			Not used.
46	PEE	Output	C	Beep output
47 – 49	NC			
50	$\overline{\text{BRST}}$	Output	C	Bus reset
51	$\overline{\text{BSRQ}}$	Input	C	Data communications serial poll request (request when L)
52	BRXEN	Input/ Output	C	Data communications busy line (busy when L)
53	AUX	Output	C	AUX B output
54	VDD			Power supply pin
56, 57	NC			
58	X1			System clock generator crystal connector pins.
59	X2			
60 – 63	NC			
64 ~ 67	KD0 ~ KD3	Input		Key data input
68	$\overline{\text{RESET}}$			Reset input

• LCD (CWW1254)

COMMON



SEGMENT

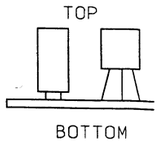

S0 S1 S2 S3 S4 S5 S6 S7 S8 S9 S10 S11 S12 S13 S14 S15 S16 S17 S18 S19 S20 S21 S22 S23
DISC
TRACK
STEP
MIN
SEC
COM1 COM0 S31 S30 S29 S28 S27 S26 S25 S24

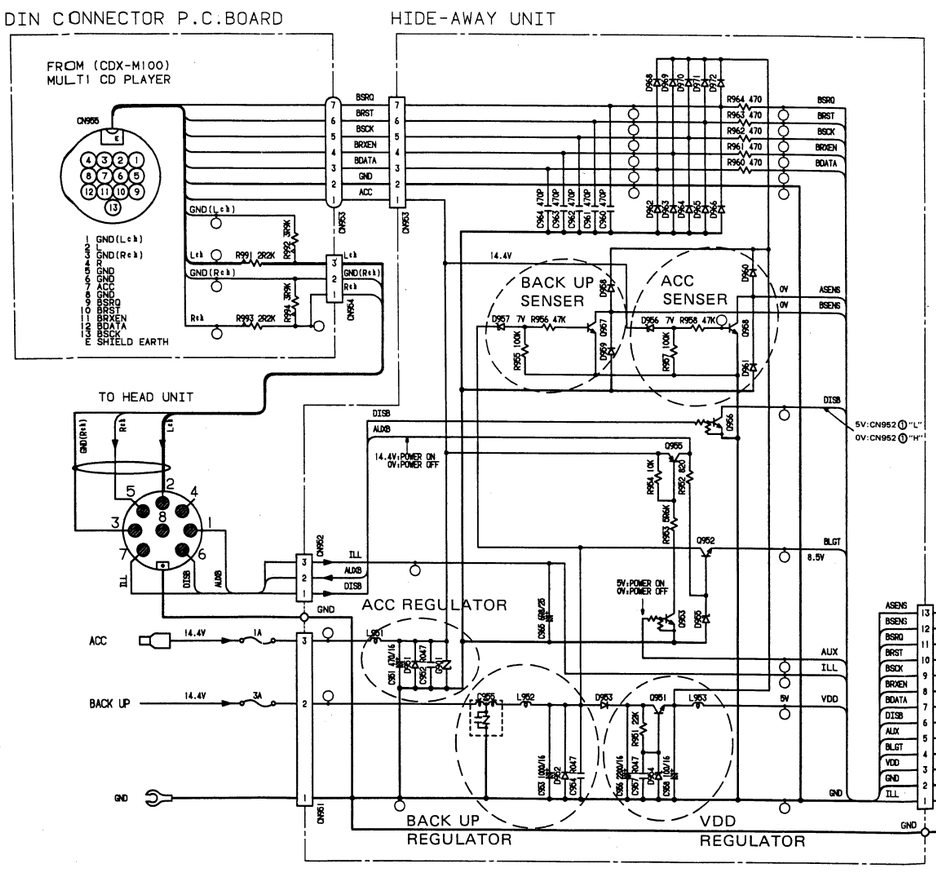
6. SCHEMATIC CIRCUIT DIAGRAM

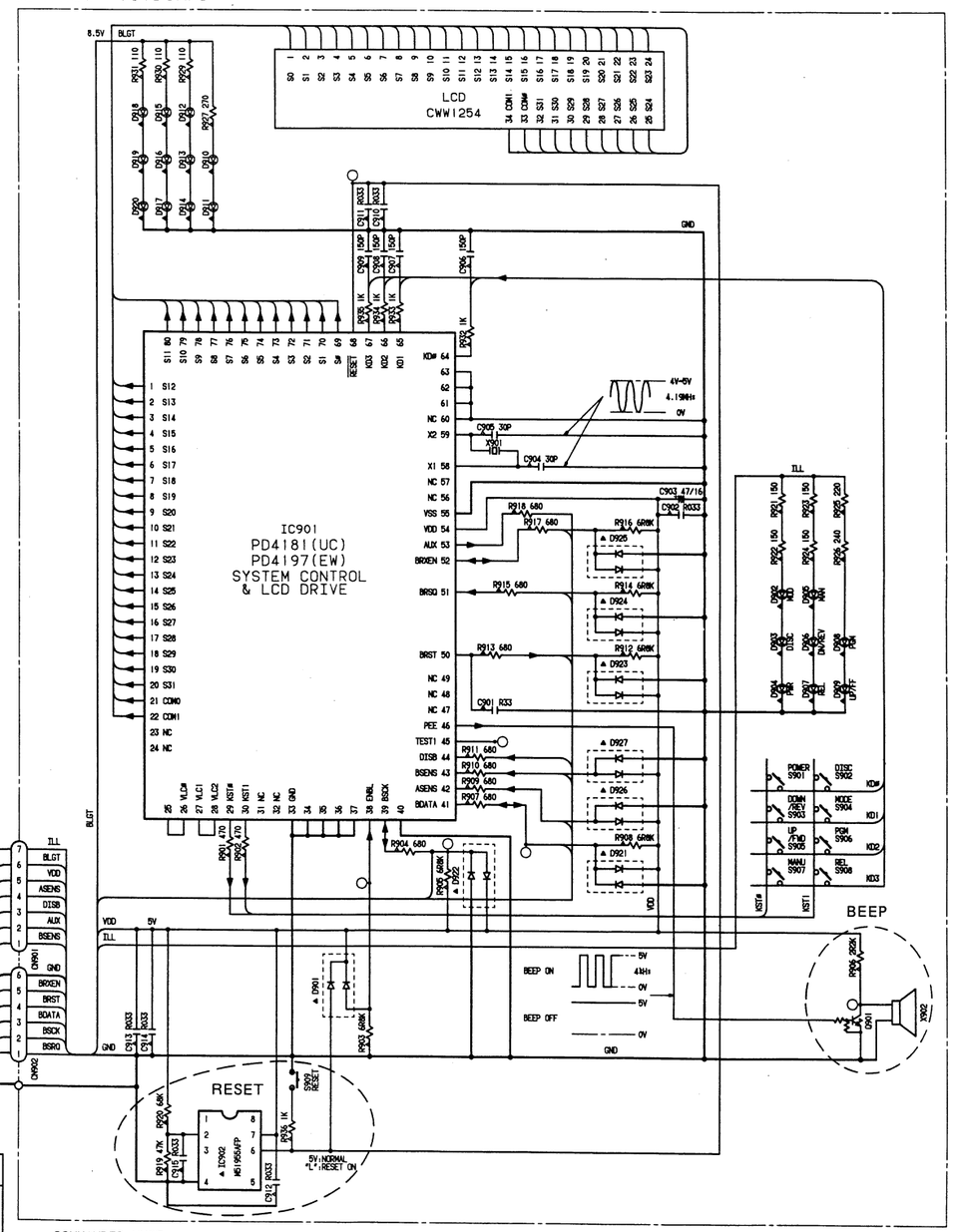
NOTE:

- Indicates a chip capacitor.
- Indicates a chip resistor.
- Indicates a chip diode.
- Indicates a chip transistor.
- △ Chip parts installed on the bottom of P.C.Board.
- ▲ Chip parts installed on the top of P.C.Board.

Decimal points for resistor and capacitor fixed values are expressed as:
2.2→2R2
0.022→R022







HIDE-AWAY UNIT

Q951	2SC3673
Q952	2SC3421
Q953,956	DTC114ES
Q955	2SB1243
Q957,958	2SC2458
D951~953	ERA15-02VH
D954	RD5R6JSB2
D955	RD9R1JSB2
D956,957	RD7R5JSB2
D958~972	1SS133

COMMANDER UNIT

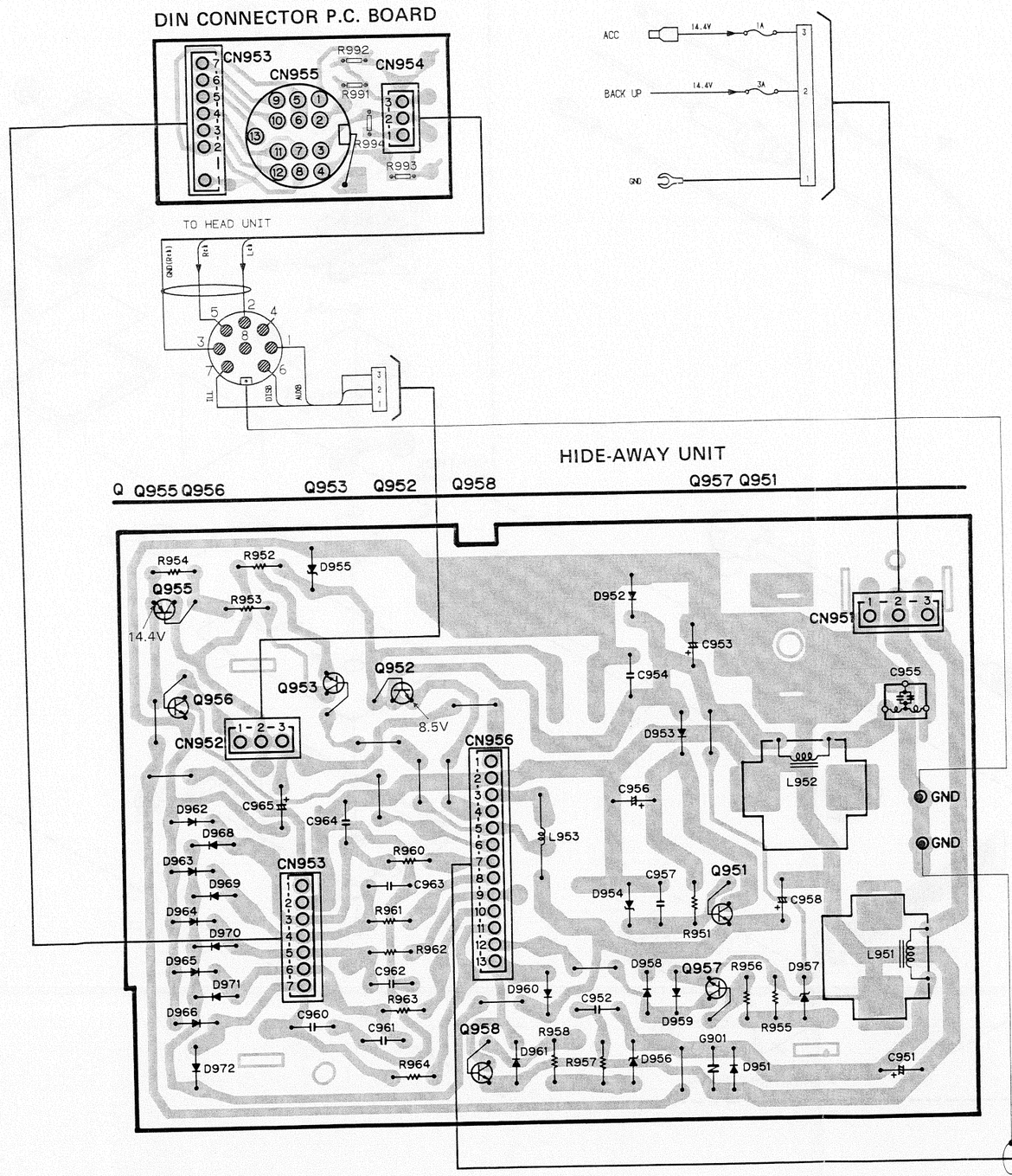
Consists of
- CONTROL P.C.BOARD
- DIN CONNECTOR P.C.BOARD

COMMANDER UNIT

	EW	UC
Q901	UN2211	UN2211
D901,916	MA151WK	MA151WK
D902~909	CL61PGCD680A	CL61YCD680A
D910~920	CL50PGCDA	CL50YCDA
D921~927	MA153	MA153
X901	CSS1029	CSS1029
X902	CPV1005	CPV1005
S901~S909	CSG-212	CSG-212

Fig. 4

7. CONNECTION DIAGRAM



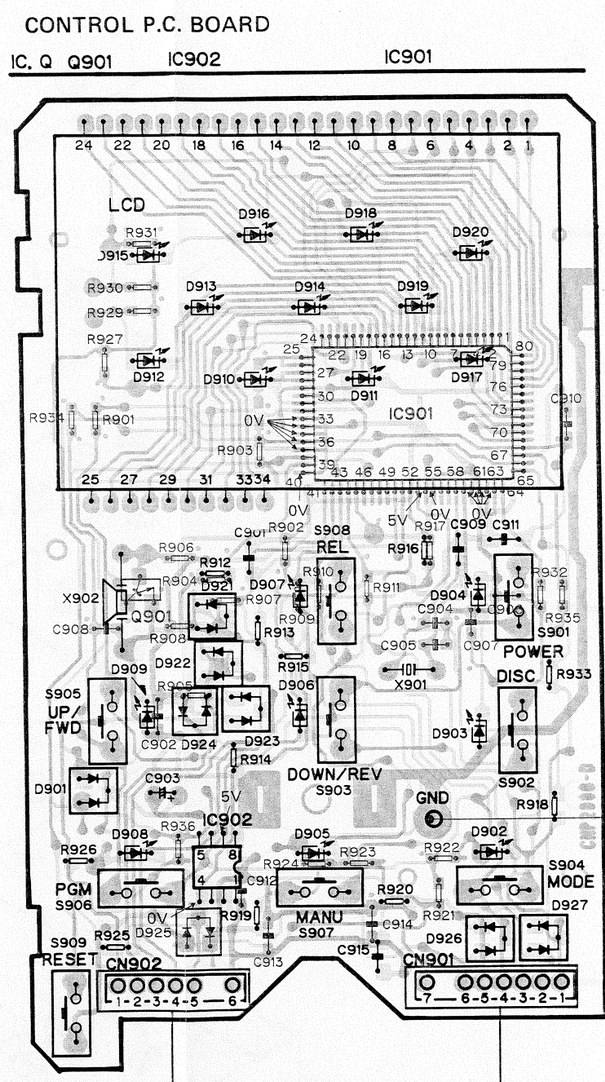


Fig. 5

8. EXPLODED VIEW

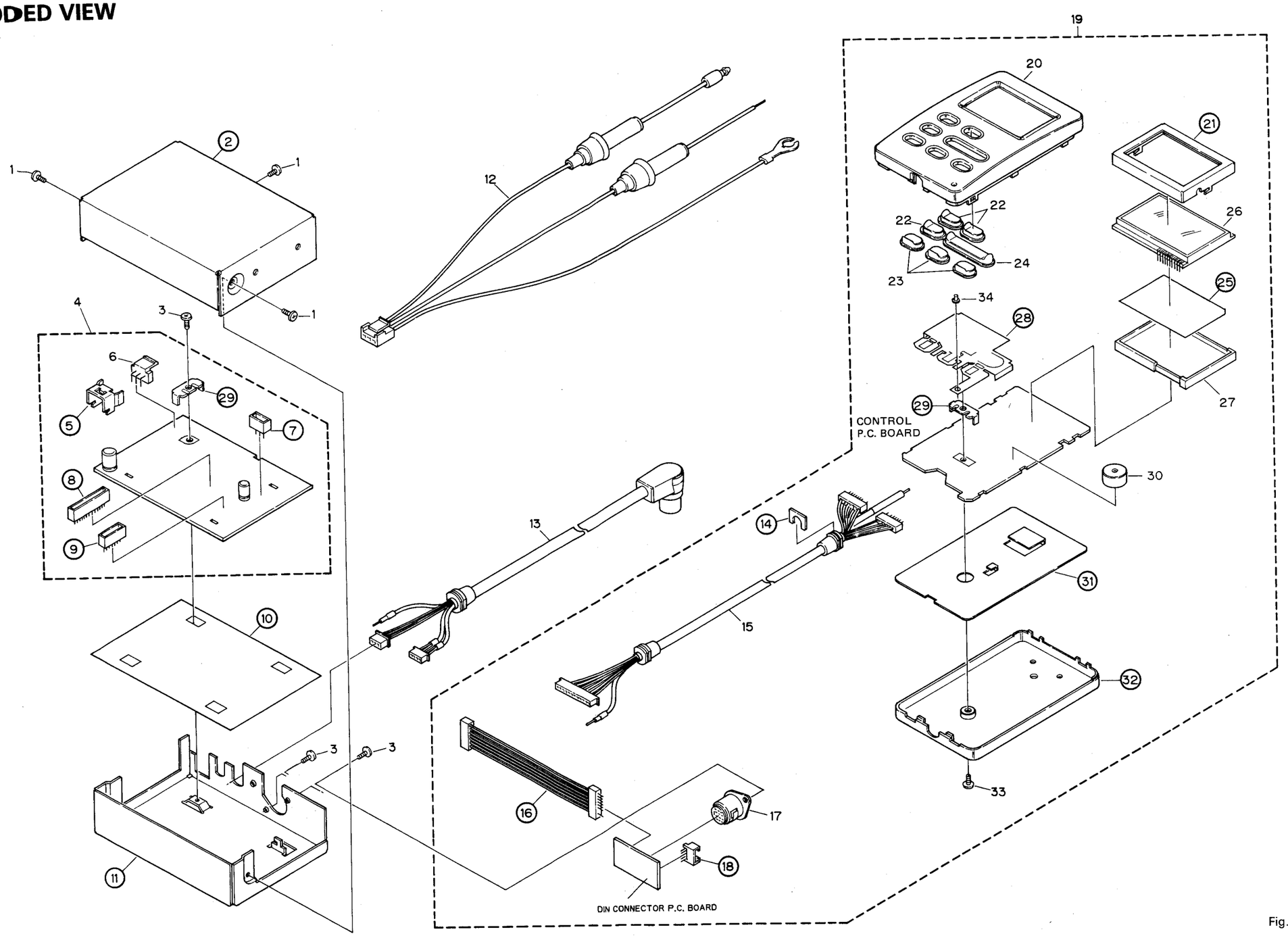


Fig. 6

• Parts List

NOTE:

- *For your parts Stock Control, the fast moving items are indicated with the marks ★★ and ★.*
  ★★: GENERALLY MOVES FASTER THAN ★.
  This classification shall be adjusted by each distributor because it depends on model number, temperature, humidity, etc.
- *Parts whose parts numbers are omitted are subject to being not supplied.*
- *Parts marked by "◉" are not always kept in stock. Their delivery time may be longer than usual or they may be unavailable.*

Mark	No.	Part No.	Description
	1	BMZ30P040FZK	Screw
	2		Case
	3	BMZ26P040FMC	Screw
◉	4	CWX1169	Hide-Away Unit
	5		Bracket
	6	CKS-460	Plug
	7		Plug
	8		Plug
	9		Plug
	10		Insulator
	11		Chassis
★	12	CDE2353	Cord(EW)
★		CDE2352	Cord(UC)
	13	CDE2217	Cord
	14		Holder
	15	CDE2234	Cord
	16		Connector
	17	CKP1007	Socket
	18		Plug
◉	19	CWX1177	Commander Unit(UC)
◉		CWX1178	Commander Unit(EW)
	20	CNS1756	Grille(UC)
		CNS1757	Grille(EW)
	21		Case
★	22	CAC1930	Button
★	23	CAC1932	Button
★	24	CAC1931	Button
	25		Plate
	26	CWW1254	LCD
	27	CNV2002	Holder
	28		Plate
	29		Holder
	30	CPV1005	Buzzer
	31		Insulator
	32		Case
	33	BBZ26P080FZK	Screw
★	34	CAC1934	Button

9. ELECTRICAL PARTS LIST

NOTE:

- *For your parts Stock Control, the fast moving items are indicated with the marks ‡‡ and ‡.*
  ‡‡ : GENERALLY MOVES FASTER THAN ‡.
  This classification shall be adjusted by each distributor because it depends on model number, temperature, humidity, etc.
- *Parts whose parts numbers are omitted are subject to being not supplied.*
- *The part numbers shown below indicate chip components.*
  Chip Resistor
  RS1/8S□□□J, RS1/10S□□□J
  Chip Capacitor (except for CQS.....)
  CKS....., CCS....., CSZS.....

Unit Number :
Unit Name : Hide-Away Unit

MISCELLANEOUS

Mark	Circuit Symbol & No.	Part Name	Part No.
‡‡	Q 951		2SC3673
‡‡	Q 952		2SC3421
‡‡	Q 953 956		DTC114ES
‡‡	Q 955		2SB1243
‡‡	Q 957 958		2SC2458
‡	D 951 952 953		ERA15-02VH
‡	D 954		RD5R6JSB2
‡	D 955		RD9R1JSB2
‡	D 956 957		RD7R5JSB2
‡	D 958 959 960 961 962 963 964 965 966		1SS133
‡	D 968 969 970 971 972		1SS133
	L 951 952	Choke Coil	CTH1005
	L 953	Ferri-Inductor	CTF-157
	G 901	Surge Absorber	ERZ-C07DK220

RESISTORS

Mark	Circuit Symbol & No.	Part Name	Part No.
	R 951		RD1/4PS223JL
	R 952		RD1/4PS821JL
	R 953		RD1/4PS562JL
	R 954		RD1/4PS103JL
	R 955 957		RD1/4PS104JL
	R 956 958		RD1/4PS473JL
	R 960 961 962 963 964		RD1/4PS471JL

CAPACITORS

Mark	Circuit Symbol & No.	Part Name	Part No.
	C 951	470μF/16V	CCH-114
	C 952 954 957		CKCYF473Z50
	C 953	1000μF/16V	CCH1003
	C 955		CCG-105
	C 956	2200μF/16V	CCH1001
	C 958		CEA101M16L2
	C 960 961 962 963 964		CKCYB471K50
	C 965		CASA6R8M25

Commander Unit(CD-M1/UC EW)

Consists of
Control P.C.Board
DIN Connector P.C.Board

Unit Number :
Unit Name : Commander Unit

MISCELLANEOUS

Mark	Circuit Symbol & No.	Part Name	Part No.
‡‡	IC 901	(UC)	PD4181
‡‡	IC 901	(EW)	PD4197
‡‡	IC 902		M51955AFP
‡‡	Q 901	Chip Transistor	UN2211
‡	D 901	Chip Diode	MA151WK-MT
‡	D 902 903 904 905 906 907 908 909	(UC) Chip LED	CL61YCD680A
‡	D 902 903 904 905 906 907 908 909	(EW) Chip LED	CL61PGCD680A
‡	D 910 911 912 913 914 915 916 917 918 919 920	(UC) Chip LED	CL50YCDA
‡	D 910 911 912 913 914 915 916 917 918 919 920	(EW) Chip LED	CL50PGCDA
‡	D 921 922 923 924 925 926 927	Chip Diode	MA153-MC
	X 901	Crystal Resonator	CSS1029
	X 902	Buzzer	CPV1005
‡‡	S 901 902 903 904 905 906 907 908 909	Switch	CSG-212
		LCD	CWW1254

RESISTORS

Mark	Circuit Symbol & No.	Part Name	Part No.
	R 901 902		RS1/10S471J
	R 903 905 908		RS1/10S682J
	R 904 907 909 910 911 917		RS1/10S681J
	R 906		RS1/10S222J
	R 912 914 916		RS1/10S682J
	R 913 915 918		RS1/10S681J
	R 919		RS1/10S473J
	R 920		RS1/10S683J
	R 921 922 923 924		RS1/10S151J
	R 925		RS1/10S221J

Mark	Circuit Symbol & No.	Part Name	Part No.
	R 926		RS1/10S241J
	R 927		RS1/10S271J
	R 929 930 931		RS1/10S111J
	R 932 933 934 935 936		RS1/10S102J
	R 991 993		RS1/10S222J
	R 992 994		RS1/10S392J

CAPACITORS

Mark	Circuit Symbol & No.	Part Name	Part No.
	C 901		CKSYF334Z25
	C 902 910 912 913 914		CKSYB333K25
	C 903		CEA470M16LS
	C 904 905		CCSQCH300J50
	C 906 907 908		CCSQCH151J50
	C 909		CCSQCH151J50
	C 911 915		CKSYB333K25

10. PACKING METHOD

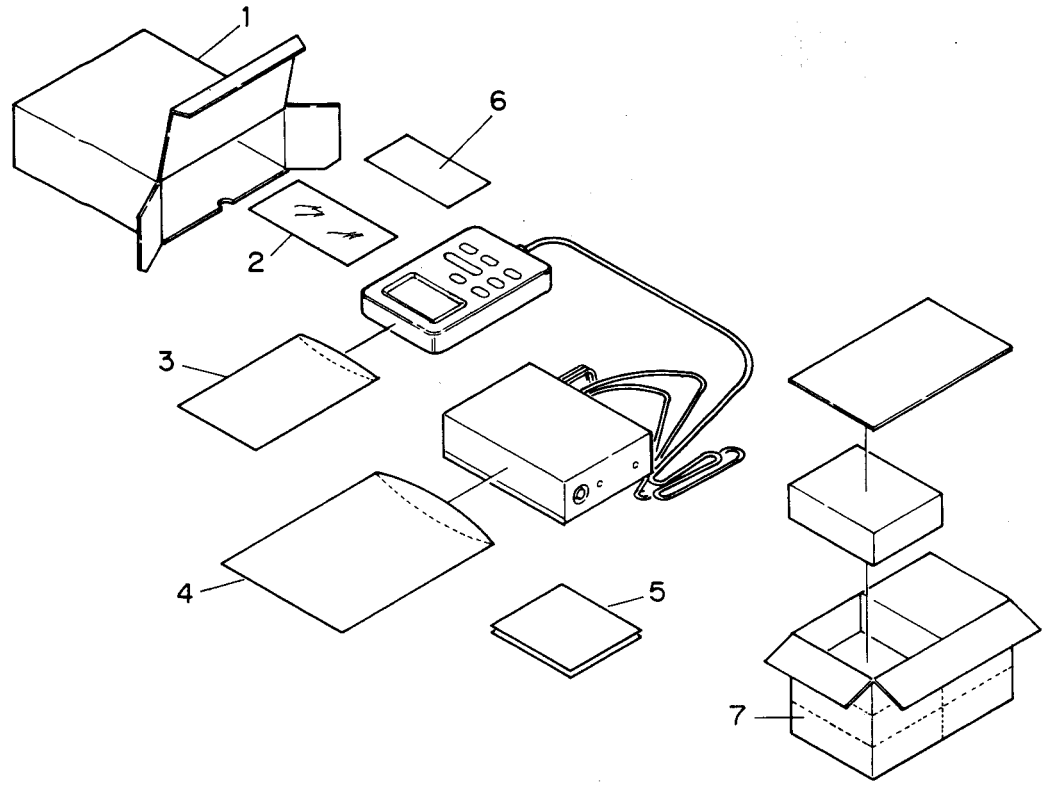


Fig. 7

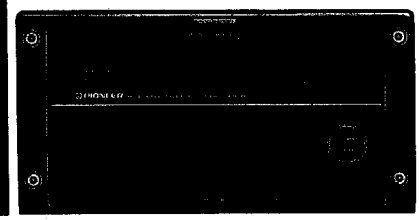
• Parts List

Mark No.	Part No.	Description		Mark No.	Part No.	Description	
1	CHG1540	Carton	(UC)	5	CRD1242	Owner's Manual	(UC)
	CHG1541	Carton	(EW)			(English , French)	
2	CEA1413	Accessory Assy			CRD1243	Owner's Manual	(EW)
2-1	BMZ30P050FZK	Screw(×1)				(English , French , German , Spanish ,	
2-2	CNC2559	Strap(Hanger)				Swedish , Norwegian , Dutch , Italian)	
2-3	CNM-667	Velcro Tape		6	CDE2352	Cord	(UC)
2-4	CNM1716	Velcro Tape			CDE2353	Cord	(EW)
2-5	CNM1717	Velcro Tape		7	CHL1540	Contain Box	(UC)
3	CEG1055	Air Cushioned Bag					
4	CEG1052	Air Cushioned Bag					

PIONEER®
The future of sound and vision.

1930

Service Manual



ORDER NO.
CRT 1136

MULTI-PLAY COMPACT DISC PLAYER

CDX-M100

UC, EW

COMPACT disc DIGITAL AUDIO

CONTENTS

1. SAFETY INFORMATION (CDX-M100/EW) 2
2. DISASSEMBLY 3
3. MECHANISM DESCRIPTION 6
4. CIRCUIT DESCRIPTION 8
5. ADJUSTMENT 29
6. SCHEMATIC CIRCUIT DIAGRAM 66
7. CONNECTION DIAGRAM 74
8. CHASSIS EXPLODED VIEW 81
9. CD MECHANISM UNIT (1) 84
10. CD MECHANISM UNIT (2) 88
11. ELECTRICAL PARTS LIST 91
12. PACKING METHOD 94
13. NAME OF PARTS AND THEIR FUNCTIONS 95
14. CONNECTION 96

SPECIFICATIONS

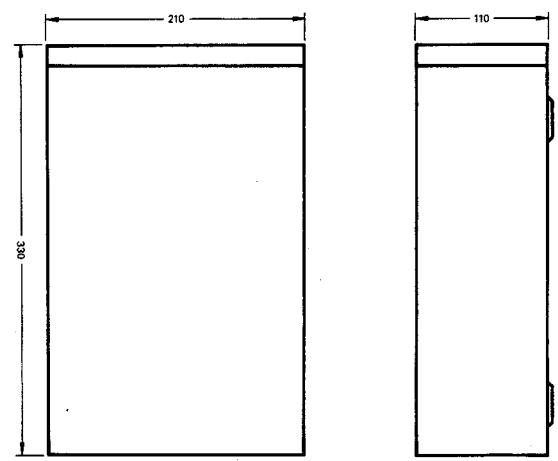
General

System ..... Compact disc audio system
Usable discs ..... Compact Disc
Signal format ..... Sampling frequency: 44.1 kHz
Number of quantization bits: 16; linear
Power source ..... 14.4 V DC (10.8 — 15.6 V allowable)
Power consumption ..... 5.5 W
Maximum power consumption ..... 9 W
Weight ..... 5.0 kg (11.0 lbs.)
Dimensions ..... 210 (W) x 110 (H) x 330 (D) mm
[8-1/4 (W) x 4-3/8 (H) x 13 (D) in.]

Audio

Frequency characteristics ..... 5 — 20,000 Hz (± 1 dB)
Signal-to-noise ratio ..... 85 dB (1 kHz)(IHF-A network)
Dynamic range ..... 87 dB (1 kHz)
Wow and flutter ..... Below measurement range
Distortion factor ..... 0.008% (1 kHz, 0 dB)
Output level ..... 500 mV (1 kHz, 0 dB)
Number of channels ..... 2 (stereo)

These specifications were determined and are presented in accordance with specification standards established by the Ad Hoc Committee of Car Stereo Manufacturers.



Note:
Specifications and the design are subject to possible modification without notice due to improvements.

PIONEER ELECTRONIC CORPORATION 4-1, Meguro 1-Chome, Meguro-ku, Tokyo 153, Japan
PIONEER ELECTRONICS SERVICE INC. P.O. Box 1760, Long Beach, California 90801 U.S.A.
PIONEER ELECTRONICS OF CANADA, INC. 505 Cochrane Drive, Markham, Ontario L3R 8E3 Canada
PIONEER ELECTRONIC [EUROPE] N.V. Keetberglaan 1, 2740 Beveren, Belgium
PIONEER ELECTRONICS AUSTRALIA PTY. LTD. 178-184 Boundary Road, Braeside, Victoria 3195, Australia TEL: [03] 580-9911

1930

FS © SEPT. 1987 Printed in Japan

• CD Player Service Precautions

1. Since these screws protects the mechanism during transport, be sure to affix it when it is transported for repair, etc.
2. For pickup unit (CGY1006) handling, please refer to "Disassembly" (Fig. 6). During replacement, handling precautions shall be taken to prevent an electrostatic discharge (protection by a short pin).
3. During disassembly, be sure to turn the power off since an internal IC might be destroyed when a connector is plugged or unplugged.

Removal of Screws

Be sure to remove transportation screws (red) ①, ② and ③ in this order.

Reinstallation of Screws

Be sure to reinstall the transportation screws (red) in the procedure described below before re-transporting the set. Incorrect order of reinstallation or use of different screws may cause the set to fail.

1. Let the set operate the first music of a disc and stop operation within 10 seconds thereafter before removing the set.
2. Remove the magazine and then the set.
3. Reinstall the transportation screws in the reverse order (③, ② and ①) of removal.

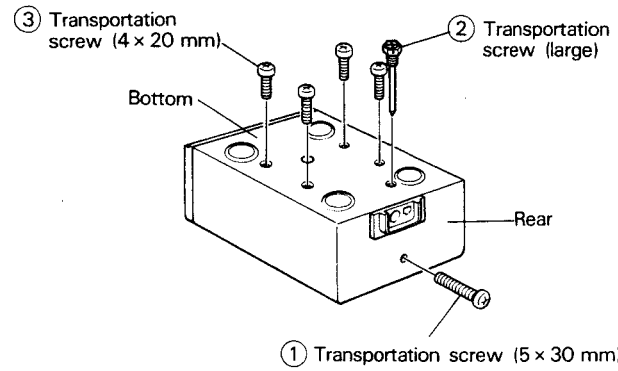


Fig. 1

• Location of Major Parts

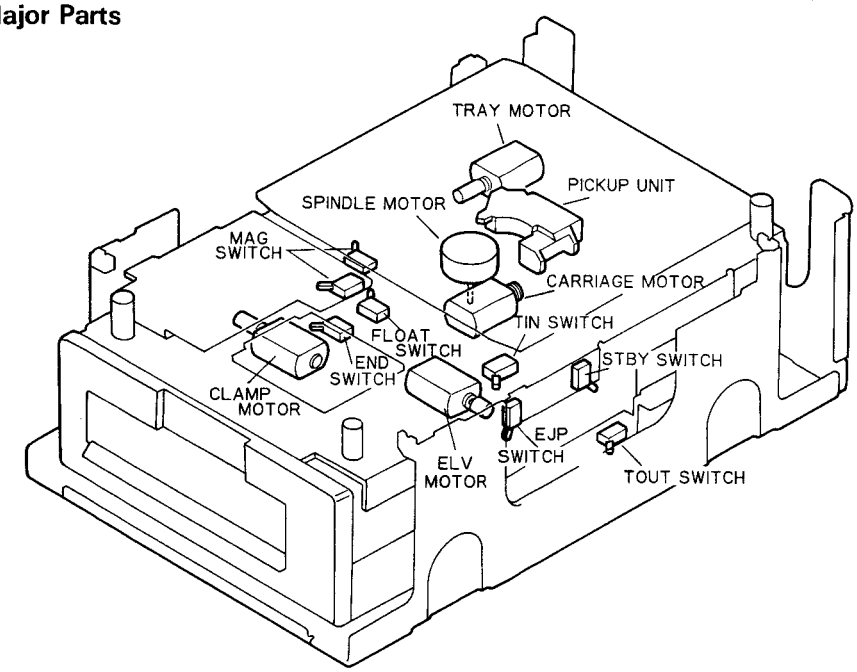


Fig. 2

1. SAFETY INFORMATION (CDX-M100/EW)

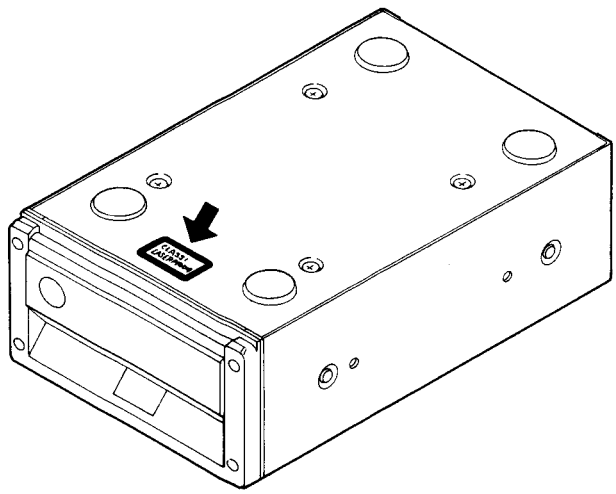
1. Safety Precautions for those who Service this Unit.

- Follow the adjustment steps (see pages 29 through 50) in the service manual when servicing this unit. Whe checking or adjusting the emitting power of the laser diode exercise caution in order to get safe, reliable results.

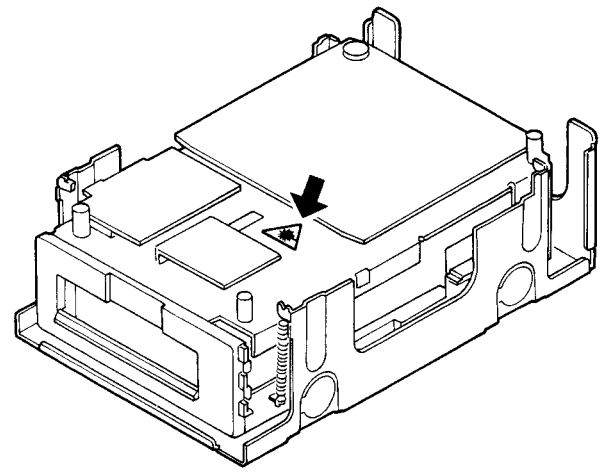
Caution:

1. During repair or tests, minimum distance of 13cm from the focus lens must be kept.
2. During repair or tests, do not view laser beam for 10 seconds or longer.

2. A "CLASS 1 LASER PRODUCT" label is affixed to the bottom of the player.



3. The triangular label is attached to the mechanism unit plate unit.



4. Specifications of Laser Diode

Specifications of laser radiation fields to which human access is possible during service.

Wavelength = 780 nanometers
Radiant power = 69.7 microwatts
(Through a circular aperture stop having a diameter of 80 millimeters)

0.55 microwatts
(Through a circular aperture stop having a diameter of 7 millimeters)

2. DISASSEMBLY

• Case

Unfasten the four screws to remove the case.

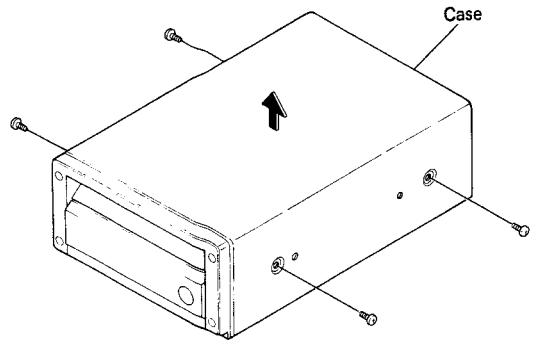


Fig. 3

• CD Mechanism Unit

1. Unfasten the four screws.
2. Disconnect the two connectors.
3. To avoid catching the part A screws, lift the unit up while pulling forward a little.

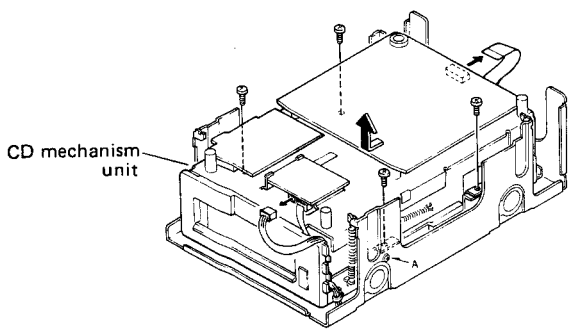


Fig. 4

• Damper Units

Unfasten the collars and screws to remove the damper units.

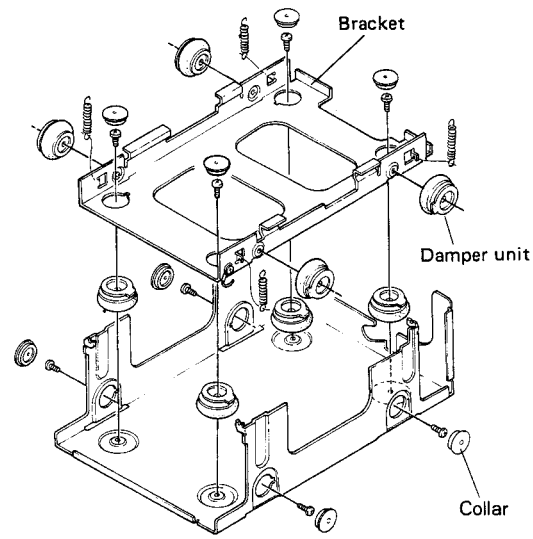


Fig. 5

• Main Unit

1. Unfasten the five screws.
2. Disconnect the four connectors to remove the main unit.

Note: When removing the flexible P.C. board, always insert a shorting pin or insert an inter-pattern short (jumper) before disconnecting the board from the connector.

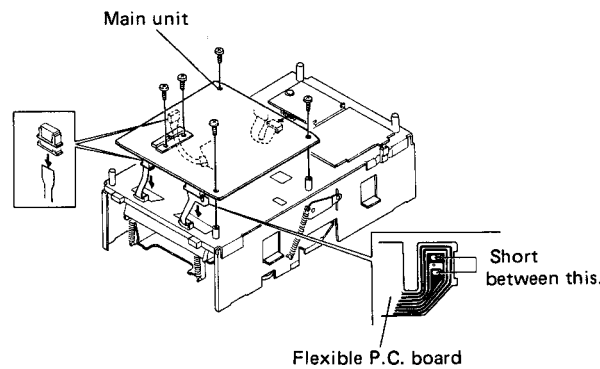


Fig. 6

• Tray Motor Unit

Unfasten the four screws to remove the tray motor unit.

• Clamper Arm Unit

1. Remove the E-shaped retaining ring and two springs to remove the clamper arm unit.

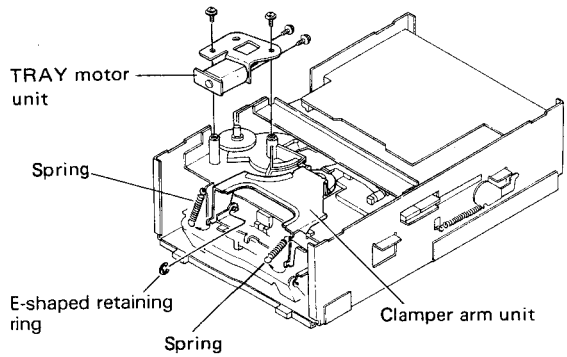


Fig. 7

• Carriage Mechanism Unit

1. Unfasten the five screws marked A to remove the sub-chassis unit.
2. Then unfasten the four screws marked B to remove the carriage mechanism ass'y.

Note: When remounting the carriage mechanism ass'y, check that pin is accounted for as shown in the diagram.

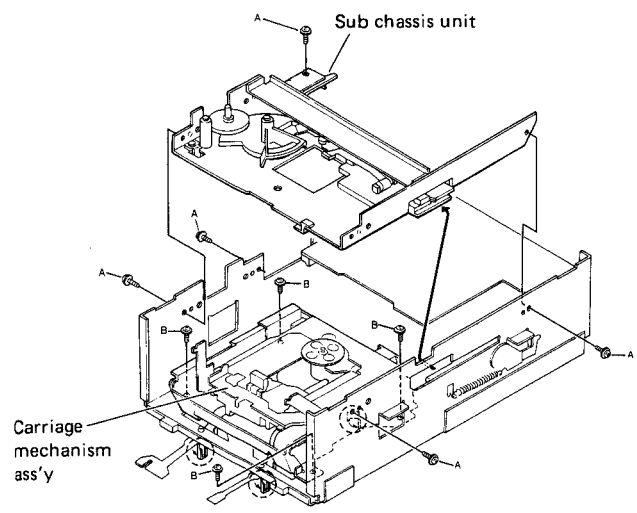


Fig. 8-1

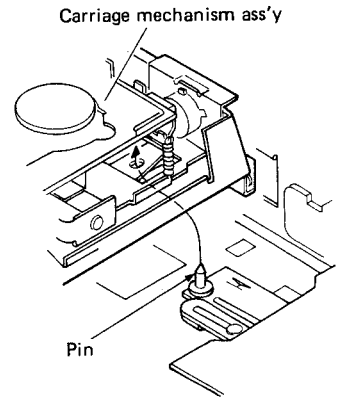
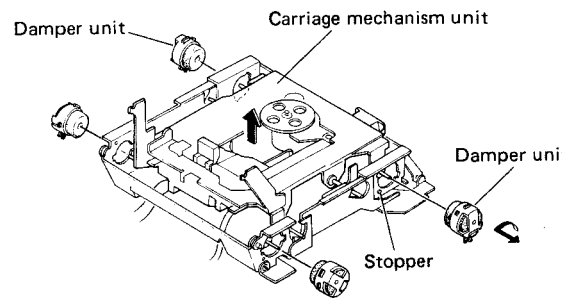


Fig. 8-2

3. Turn the damper units, and remove by aligning the groove.
4. Remove the carriage mechanism unit.



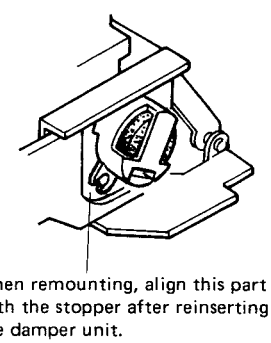


Fig. 9

• Magazine Holder

1. Position the magazine holder at the top (by turning the elevation gear).
2. Remove the two springs, three E-shaped retaining rings, and two rollers. (The rollers are stopped with the smaller diameter roller on the inside.)
3. Unfasten the three screws and the side frame unit.

Note: When remounting the side frame unit, make sure that the arm unit pin is as indicated in the diagram.

4. Remove the magazine holder.

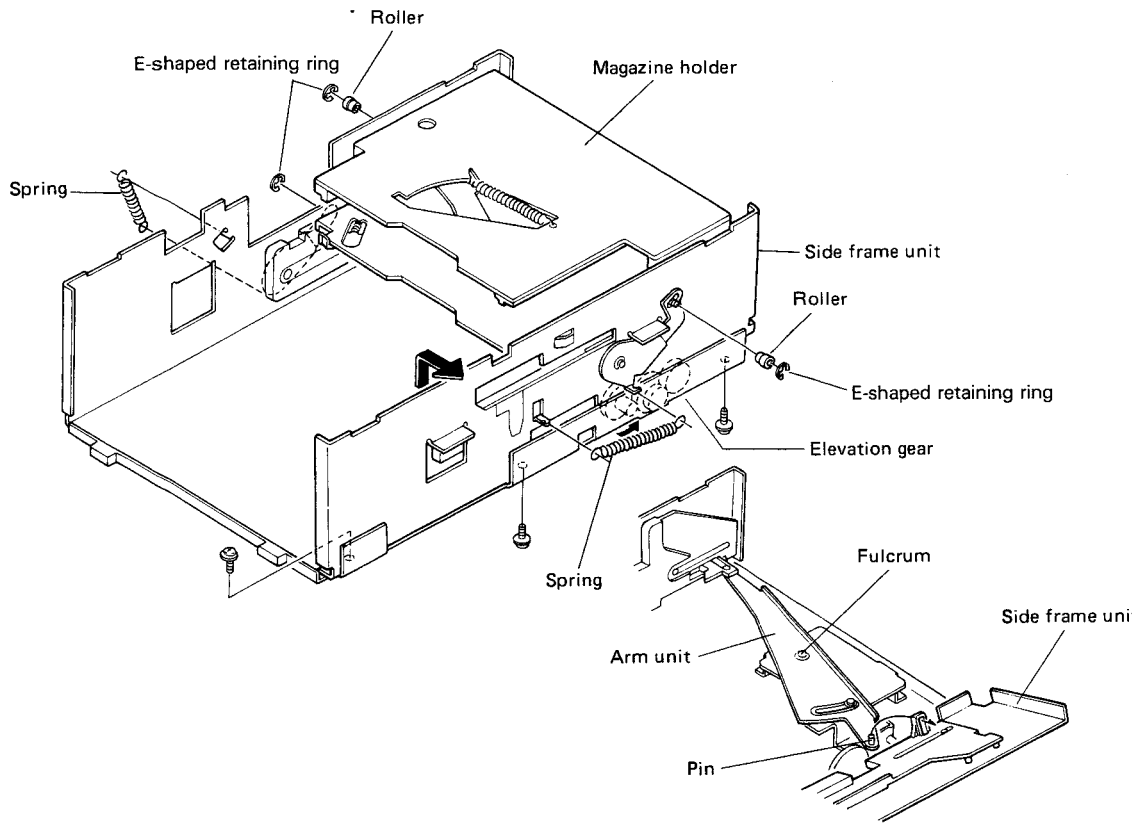


Fig. 10

3. MECHANISM DESCRIPTION

• Magazine Insertion and Disc Detection

1. When the magazine is inserted, the MAG-1 switch (magazine sensor) is switched ON by a lever.
2. The MAG-2 switch is switched ON (magazine lock hole is sensed) and the magazine is locked by the same lock arm action.

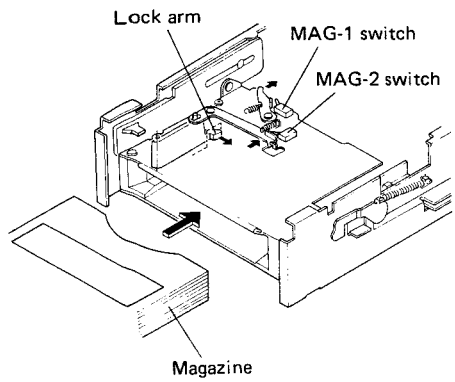


Fig. 11

3. The ELV (elevation) motor is started when both the MAG-1 and MAG-2 switches are switched ON. As a result, the left and right side frame unit stairs are activated.
4. After an initial stair movement which switches the EJP switch ON (reset action), the stairs move back.
   The magazine position sensor hole is detected by a photo-interrupter, and the ELV motor stops when the first hole (for tray 6) is reached.
5. The magazine holder is raised and lowered along magazine holder guide grooves in the left and right side frame units.

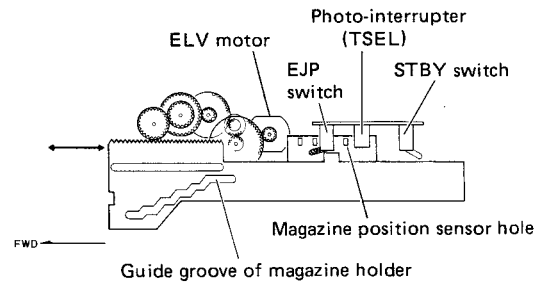


Fig. 12

6. The tray motor is started and the gears begin to turn. Lever (1) is pushed in the direction of the arrow by gear action, and lever (2) is shifted by spring (1) (the spring which keeps the tray against the stopper when a tray is ejected).
7. Lever (2) turns the arm in the direction of the arrow. The magazine trays are pushed out by this arm.
8. The tray motor is reversed and the tray housed as soon as a disc is detected by the disc sensor photo-interrupter (disc presence detection).
   The tray motor is stopped when the TOUT switch is switched ON.
9. Likewise, the presence of a disc is detected by steps 6 thru 1.

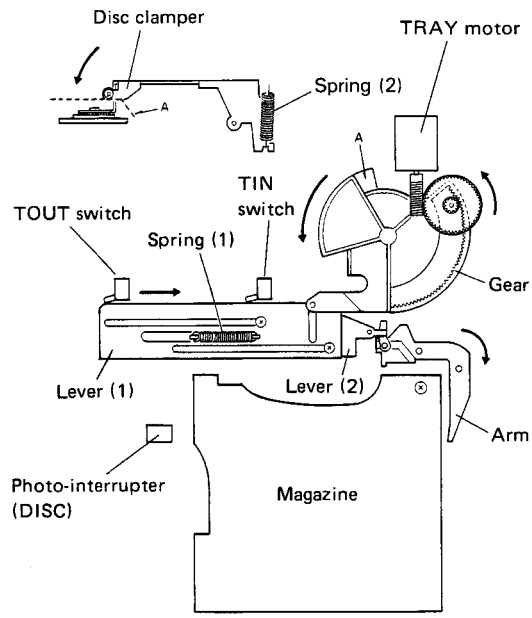


Fig. 13

• Disc Playback Operation

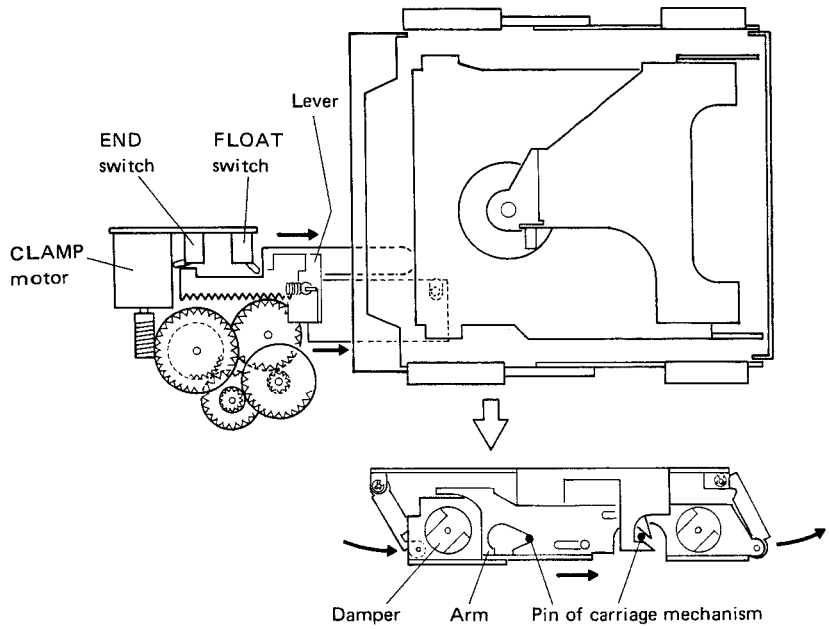


Fig. 14

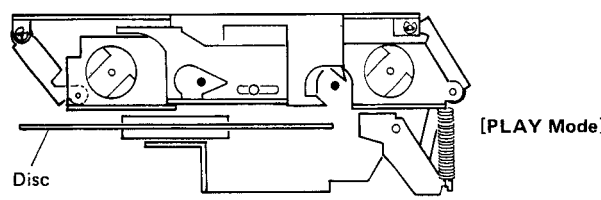


Fig. 15

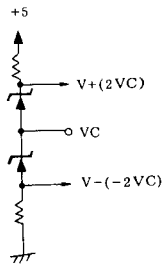
1. A tray is ejected by tray motor action in the same way as during disc detection.
2. As soon as the TIN switch is switched OFF, the tray motor is stopped and the tray is held in position.
3. The disc clamper is fixed by gear, but is released when the disc clamper pin reaches section A while the gear is turning. After the disc clamper is released, the disc is held in position by spring (2).
4. The carriage mechanism is locked with the pin caught by the arm.
5. The lever is moved in the direction of the arrow by clamp motor rotation.
6. The carriage mechanism is unlocked by the lever pressing against the arm to enable disc playback (with the mechanism in a "floated" state).
7. The clamp motor ON/OFF timing is controlled by the FLOAT and END switches.

4. CIRCUIT DESCRIPTION

1. Preamplifier Stage

The preamplifier stage processes the pick-up output signal, and generates signals for the following servo, demodulator, and control stages. The signal from the pick- up undergoes I-V conversion in the preamplifier IC901 (with built-in photo-detector), and is then processed in the RF amplifier (IC351) to generate RF, FE, and TE signals.

This stage consists of the single-chip IC CXA1081M divided into a number of component sections. Because of the single power line (+5V) specifications of this system, the signal reference voltage VC is 2.5V. All subsequent voltages are expressed in the "VC" unit. (The unit of voltage when the reference voltage is 0V is "V".)



Stabilized voltage
Used in offset volume

The internal configuration of this 30-pin flat package IC is shown in Figure 16.

The major component sections are outlined below.

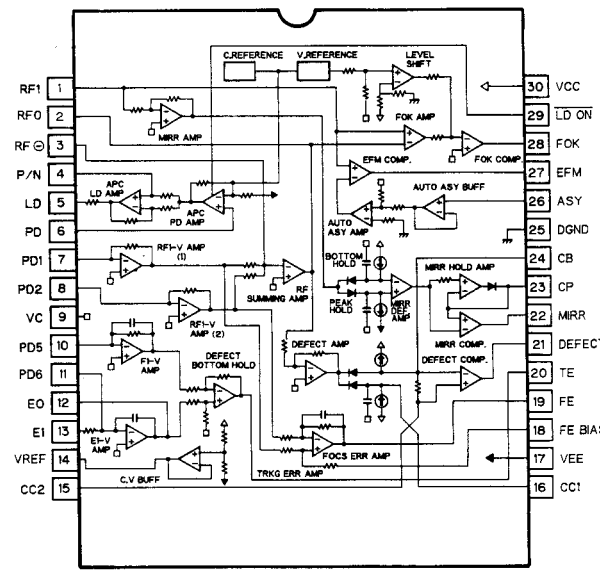


Fig. 16 Block diagram

(1) RF amplifier

The photo-detector outputs A, B, C, and D are added in amplifiers (1) and (2) to generate the (B+D) and (A+C) RF signals. The outputs are also added in the RF summing amplifier with the resultant output (A+B+C+D) being passed to RFO. (The eye pattern check can be executed at this pin.)

The low frequency components in the RFO output voltage VRFO are:-

VRFO = − [(R354+R378)/10kΩ] × (VA+VB)

VA = −[58kΩ/R358] × (VA'+VC')

VB = − [58kΩ/R356] × (VB'+VD')

Both R378 and R354 are 22 kΩ in this case.

An RF (DC) output with a peak value of 1.6[VC] and a bottom of about 0.4[VC] when DC, and VRFO = 1.2Vp-p when AC is obtained at the RFO output (pin 2).

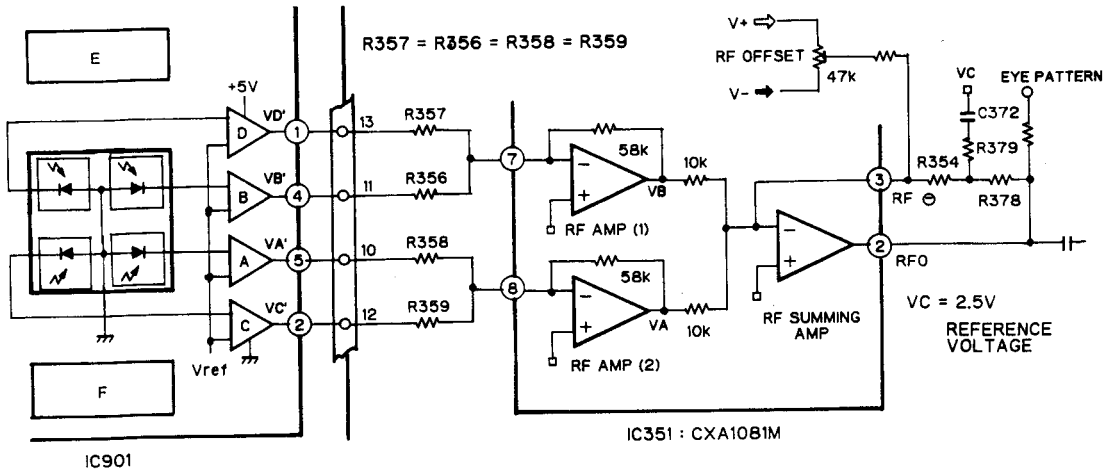


Fig. 17 Block diagram

(2) Focus error amplifier

The difference between the RF amplifier (1) output VB and the RF amplifier (2) output VA is taken to obtain the A+C−B−D signal.

The FE output voltage (low frequency) is

$V_{FE} = 5.4 \times (VA - VB)$

When the combined impedance to ground is about 10 kΩ (VR resistance about 40 kΩ), the external VR connected to pin 18 is set to maximum common mode rejection.

The FE output (pin 19) attains a voltage of about 2[Vp-p] describing an S-curve.

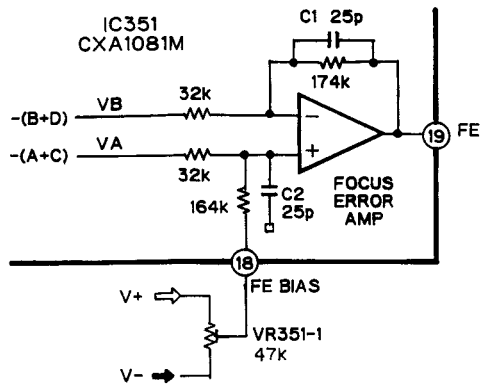


Fig. 18 Focus error amp circuit

(3) Tracking error amplifier

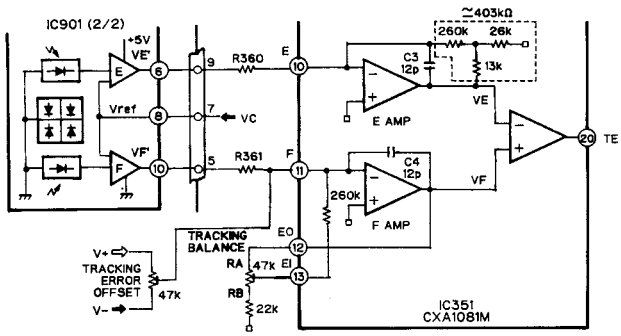


Fig. 19 Tracking error amp circuit

The side-spot PIN diode voltage applied to E and F is amplified by the respective E and F amplifiers. That is,

$VE = -(403\ k\Omega/R360) \times VE'$

$VF = -[260\ k\Omega \times RA/(RB + 22\ k\Omega) + (RA + 260\ k\Omega)]/R361 \times VF'$

The E and F amplifier difference is obtained by the tracking error amplifier to generate the (E-F) output. The tracking error amplifier gain at 3.2 (10.1dB) is

$VTE = (VF' - VE') \times 403\ k\Omega/R360 \times 3.2$

C3 and C4 are necessary to prevent leakage of EFM components to the tracking error output.

The T·E offset VR cancels DC offset from the preamplifier up to the servo amplifier, and the tracking error signal symmetry is adjusted by the TRKG balance VR. These conditions are mainly required to ensure normal track jumping. The tracking error of about 1 [Vp-p] is obtained as the pin 20 output.

(4) Focus OK circuit

The focus OK circuit generates the timing window for switching the focus servo ON when in focus search status.

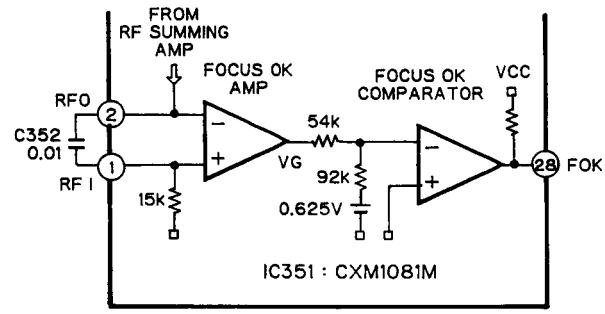


Fig. 20 Focus OK circuit

The high-pass filter output for the RF signal from pin no.2 is obtained from pin no.1, thereby providing the phase of the low-pass filter output (opposite phase) of the focus OK amplifier output.

The focus OK output is inverted when $V_{RFI} - V_{RFO} \fallingdotseq -0.39V$.

C352 determines the time constants for the EFM comparator, the mirror circuit high-pass filter, and the focus OK amplifier low-pass filter. This can help prevent deterioration in the block error rate caused by RF envelope loss in scratched discs.

The optimum C352 value in this system is 0.01 [μF]. In this case, fc = 1kHz.

(5) Mirror circuit

RFI signal amplification is followed by peak and bottom holding. Peaks are held by a time constant which enables the peak hold status to follow a 30 kHz traverse, and bottom levels are held by a time constant which enables the bottom hold status to follow deviations in the rotating cycle envelope.

The DC playback envelope signal (J) is obtained by differential amplification of the peak and bottom hold signals (H) and (I). The mirror output is obtained by comparing this (J) signal with signal (K) obtained by peak holding (using a large time constant) a level equal to 2/3 the peak value. That is, the mirror output is "L" when on a disc track, "H" when between tracks (mirror portion), and also "H" when a defect is detected. The mirror hold time constant needs to be sufficiently larger than the traverse signal.

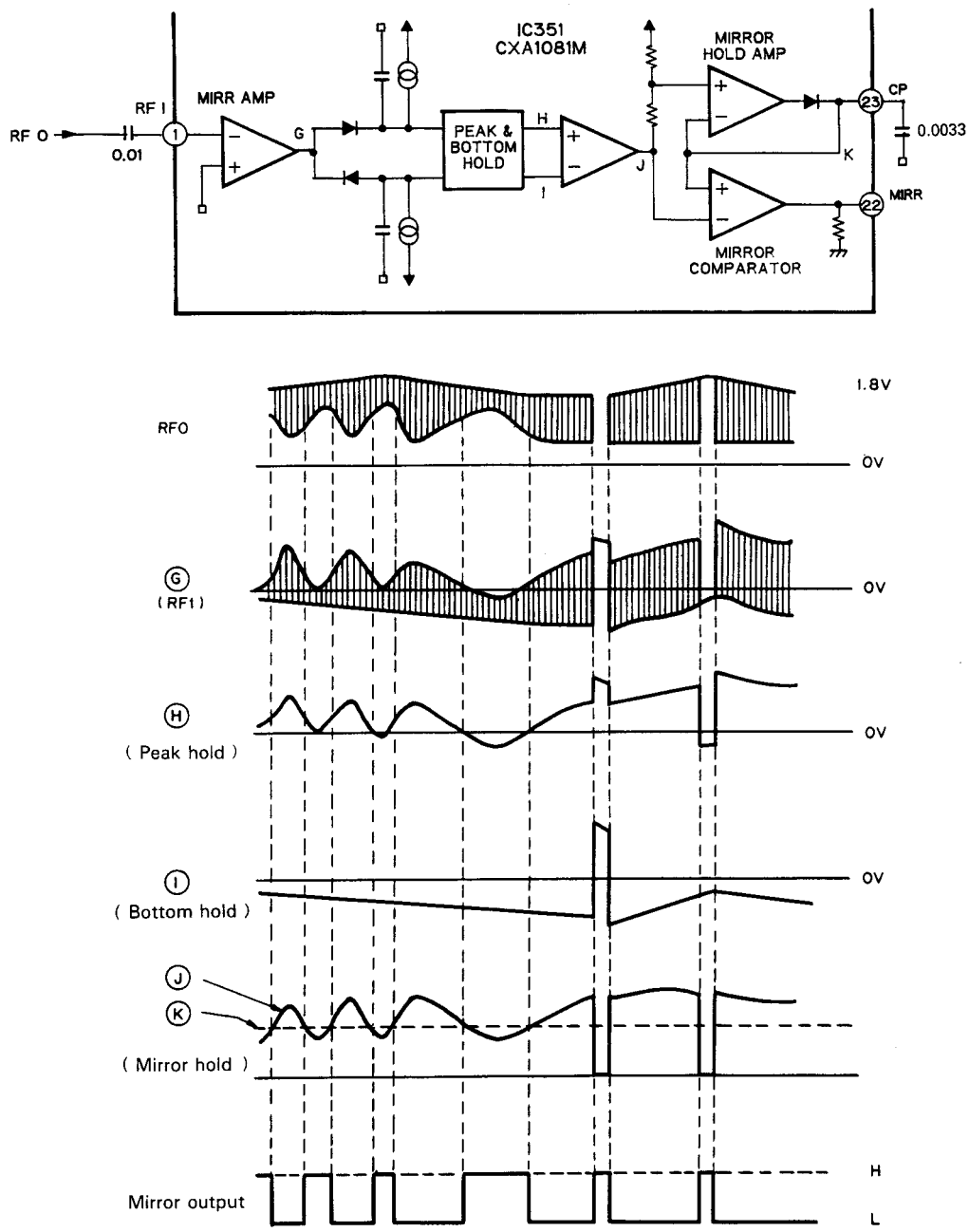


Fig. 21 Mirror circuit

(6) EFM comparator

The EFM comparator splits the RF signal into a bi-value signal. Since the asymmetry resulting from variations in disc manufacture cannot be eliminated only by AC coupling, the fact that 1,0 offered probability in the bi-value EFM signal is 50% each is used to control EFM comparator reference voltage.

Since the EFM comparator is a current switch type, the "H" and "L" levels are not the same as the power supply voltage. Therefore, feedback must be applied via a CMOS buffer.

R367, R715, C359, and C724 form a low-pass filter used to obtain +2.5V DC. leakage of the EFM low region components becomes serious if fc = 500Hz is exceeded, resulting in deterioration of the block error rate.

This system is divided into two stages with fc = 3.4[Hz] at C359 = 0.47μF and R367 = 100 kΩ, and fc = 1.6[kHz] at C724 = 0.01μF and R715 = 10 kΩ.

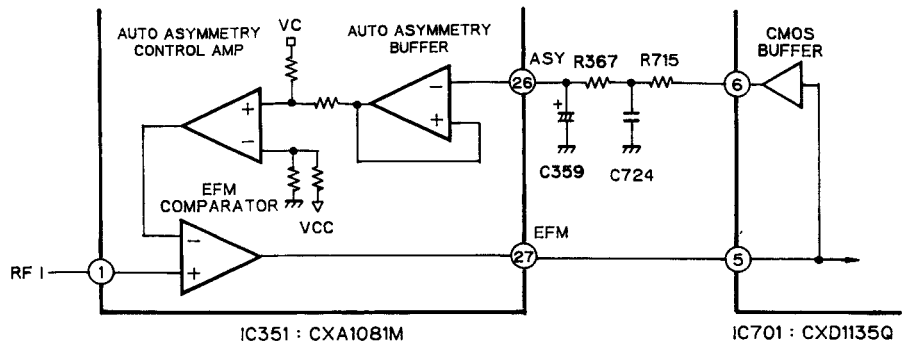


Fig. 22 EFM comparator circuit

(7) Automatic power control (APC) circuit

When laser diodes are driven by constant current, the optical output exhibits large negative thermal characteristics. The monitor photodiode output, therefore, must be controlled to maintain the current at a constant level. This control is handled by the APC circuit. LDI is about 40mA in this system.

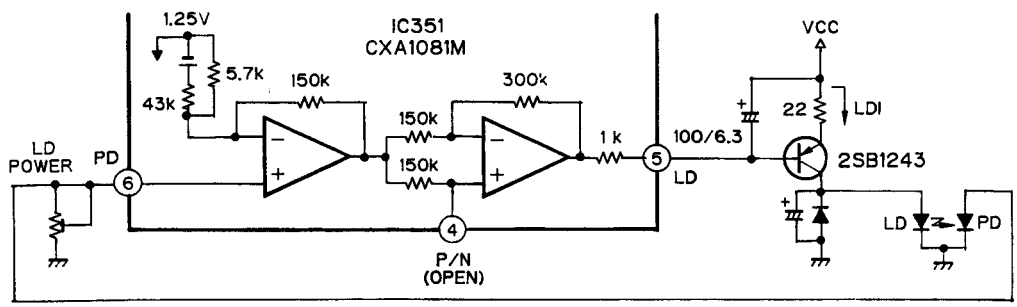
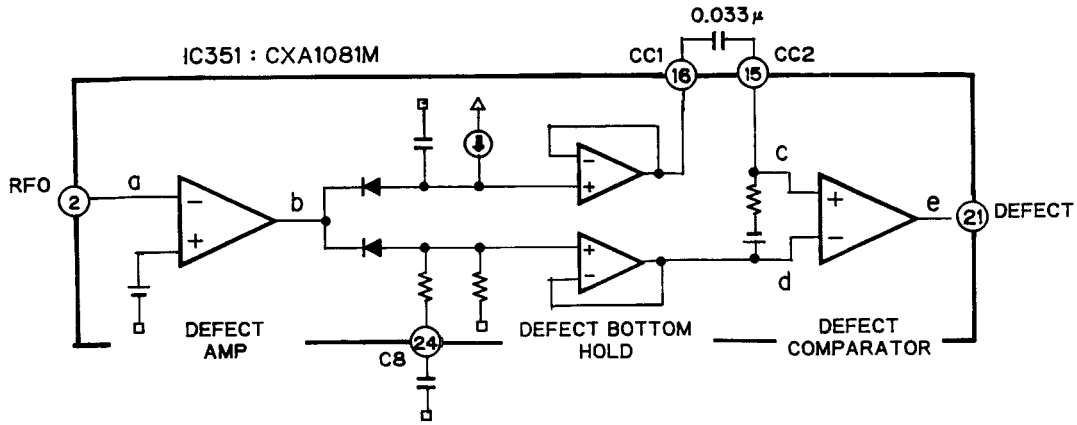


Fig. 23 APC circuit

(8) Defect circuit

RFI signal inversion is followed by bottom holding with two different time constants - one small and the other large. The small time constant bottom holding is in response to defects in excess of 0.1 msec in the disc's mirror, and the large time constant bottom holding holds the mirror level preceding the defect. Comparing the two signals by C-coupling differentiation plus level shifting results in the generation of a mirror defect detector signal (defect signal).

In this system, the defect signal is used to generate an "H" output (when a defect is detected), and switch the tracking and focus servos OFF, and thereby improve the playability.



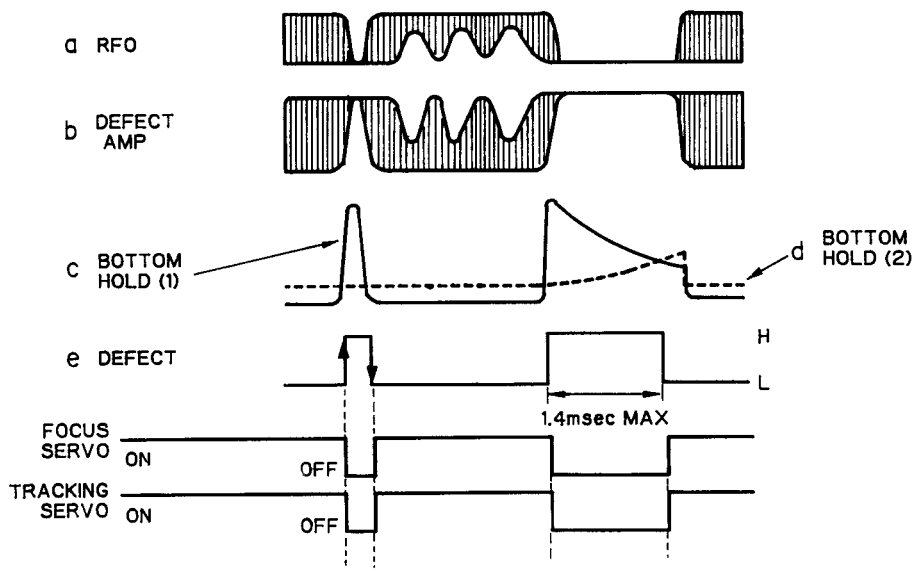


Fig. 24 Defect circuit

2. Servo Stage

This stage covers focus, tracking, carriage, and spindle servo operations, plus in-focus and track-jump servo control by executing commands from the system microcomputer. This block diagram centered about this 48-pin flat package IC (CXA1082AQ) is shown in Figure 25. This IC incorporates an auto sequencer for execution of track jumping by transfer of serial data from the system microcomputer.
The major components are outlined below.

(1) Command Code

CXA1082AQ and the demodulator IC CXD1135Q are controlled by serial data from the system microcomputer. Various detector outputs are obtained from the SENS pin.
The serial data, CLK, and command execution XLT timing chart is shown in Figure 26.

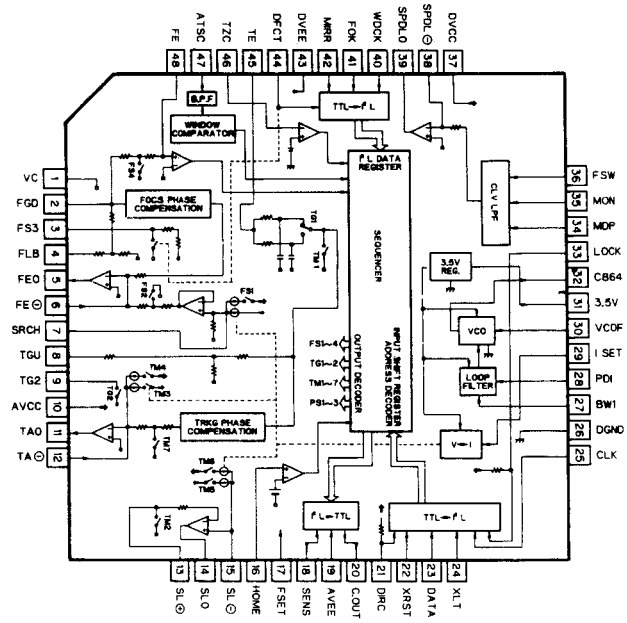


Fig. 25 CXA1082AQ Block diagram

Table 1 Operation mode and data of the CXA1082AQ

System control

Parameter		ADDRESS	DATA				SENS OUT
		D7 D6 D5 D4	D3	D2	D1	D0	
Focus Control		0 0 0 0	FS4	FS3	FS2	FS1	FZC
			Focus	Gain	Search	Search	
			ON	Down	ON	Up	
Tracking Control		0 0 0 1	Anti	Brake	TG2	TG1	A.S
			Shock	ON	Gain Set		
Tracking Mode		0 0 1 0	Tracking Mode *1		Sled Mode *2		TZC
Select		0 0 1 1	PS4	PS3	PS2	PS1	SSTOP
			Focus	Focus	Sled	Sled	
			Search +2	Search +1	Kick +2	Kick +1	
Auto Sequence		0 1 0 0	AS3	AS2	AS1	AS0	BUSY
RAM SET	Blind (A.E)/Overflow (C)	0 1 0 1	0.18 ms	0.09 ms	0.045 ms	0.022 ms	Hi-Z
	Brake (B)		0.36 ms	0.18 ms	0.09 ms	0.045 ms	
	Kick (D)	0 1 1 0	11.6 ms	5.8 ms	2.9 ms	1.45 ms	
	Track Jump (N)	0 1 1 1	64	32	16	8	
	Track Move (M)		128	64	32	16	

*1 TRACKING MODE

	D3	D2
OFF	0	0
ON	0	1
FWD JUMP	1	0
REV JUMP	1	1

*2 SLED MODE

	D1	D0
OFF	0	0
ON	0	1
FWD MOVE	1	0
REV MOVE	1	1

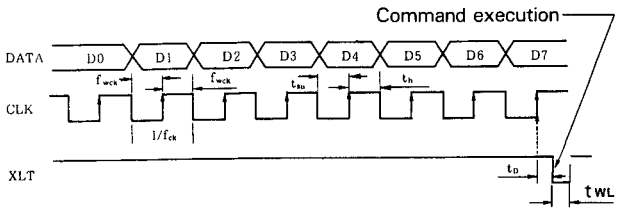


Fig. 26 CPU serial interface timing chart

Parameter	Symbol	Minimum value	Typical value	Maximum value	Unit
Clock frequency	f_{ck}			1	MHz
Clock pulse width	f_{wck}	500			ns
Set-up time	t_{su}	500			ns
Hold time	t_h	500			ns
Delay time	t_D	500			ns
Latch pulse width	t_{WL}	1000			ns

DV_{CC} − DGND = 4.5 ~ 5.5 V

a) Commands

The 8-bit input data used to drive this IC is expressed below as 2-digit hexadecimal values in the $XX format (where X is a value from 0 to F).

There are eight main types of commands used in CXA1082AQ. These are numbered $0X thru $7X.

1. $0X (SENSE pin ⑱ "FZC")

Focus servo control command

Bit configuration:

D7	D6	D5	D4	D3	D2	D1	D0
0	0	0	0	FS4	FS3	FS2	FS1

The four switches FS1 thru FS4 related to focussing correspond to D0 thru D3.

2. $1X (SENSE pin ⑱ "AS")

This command is related to TG1, TG2, and brake circuit ON/OFF.

D7	D6	D5	D4	D3	D2	D1	D0
0	0	0	1	ANTI SHOCK ON/OFF	Brake circuit ON/OFF	TG2	TG1

3. $2X (SENSE pin ⑱ "TZC")

This command is involved in tracking servo and sled servo ON/OFF, and generation of jump and fast forward pulses during access.

D7	D6	D5	D4	D3 D2	D1 D0
0	0	1	0	Tracking control	Sled control
				00 off	00 off
				01 Servo ON	01 Servo ON
				10 F-JUMP	10 R-fast feed
				11 R-JUMP	11 F-fast feed
				TM1, TM3 , TM4	TM2, TM5, TM6

The SENSE pin (pin 18)

The SENSE pin output differs according to the input data.

FZC when $0X,
AS when $1X,
TZC when $2X,
SSTOP when $3X,
$\overline{\text{BUSY}}$ when $4X,
HIGH-Z when $5X thru $7X

Since $7X and above are CXD1135 command codes, connection to the CXD1135 SENS pin enables a number of different outputs to be obtained from the one pin.

Since tracking jumps are executed by the auto sequencer, the $4X $\overline{\text{BUSY}}$ output is the only CXA1082AQ output used by the system microcomputer.

(2) Focus Servo System

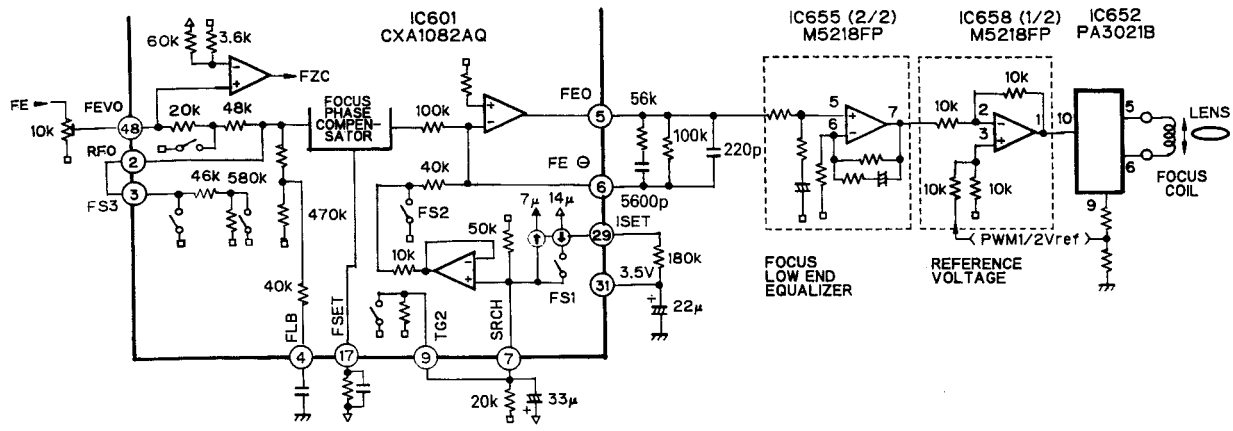


Fig. 27 Focus servo system block diagram

The above diagram is a block diagram of the focus servo system. The capacitor connected to pin 4 is the time constant designed to boost the low end during normal playback. The built-in constant current (ISET current) is determined by the resistance connected across pins 29 and 31, the current being 7μA at 180 kΩ.

ISET current = 1.27V/R

This current is used in focus search, tracking jump, and carriage kick operations. The FZC comparator inverted input reference voltage is set to (VCC-VC) × 5.7% (Approx. 140mV)

a) In-focus (search voltage)

The in-focus sequence drives the lens within the focus S curve (approximately 10 μm) and closes the servo loop when focussed. The search voltage is determined by the focus actuator sensitivity, this being set to ensure lens driving distance of ± 1mm. The pin 7 voltage is

−7[μA] × 14.3(kΩ) × 0.63 = −0.063[VC] : Lens up when FS1 is OFF, and

(14−7)[μA] × 14.3(kΩ) × 0.63 = +0.063[VC] : Lens down when FS1 is ON.

(14.3 kΩ = 50 kΩ// 20kΩ)

Hence, the lens is moved up and down by switching FS1 ON and OFF. (The up/down time constants are determined by the resistance and capacitance connected to pin 7.)

Note that in-focus does not use the auto sequencer. Execution is in accordance with the timing chart (see Figure 28). The reason for this is the focus close command is issued only during lens up operation in order to prevent in-focus malfunction.

* The expression "lens up" signifies that the lens comes closer to the disc surface.

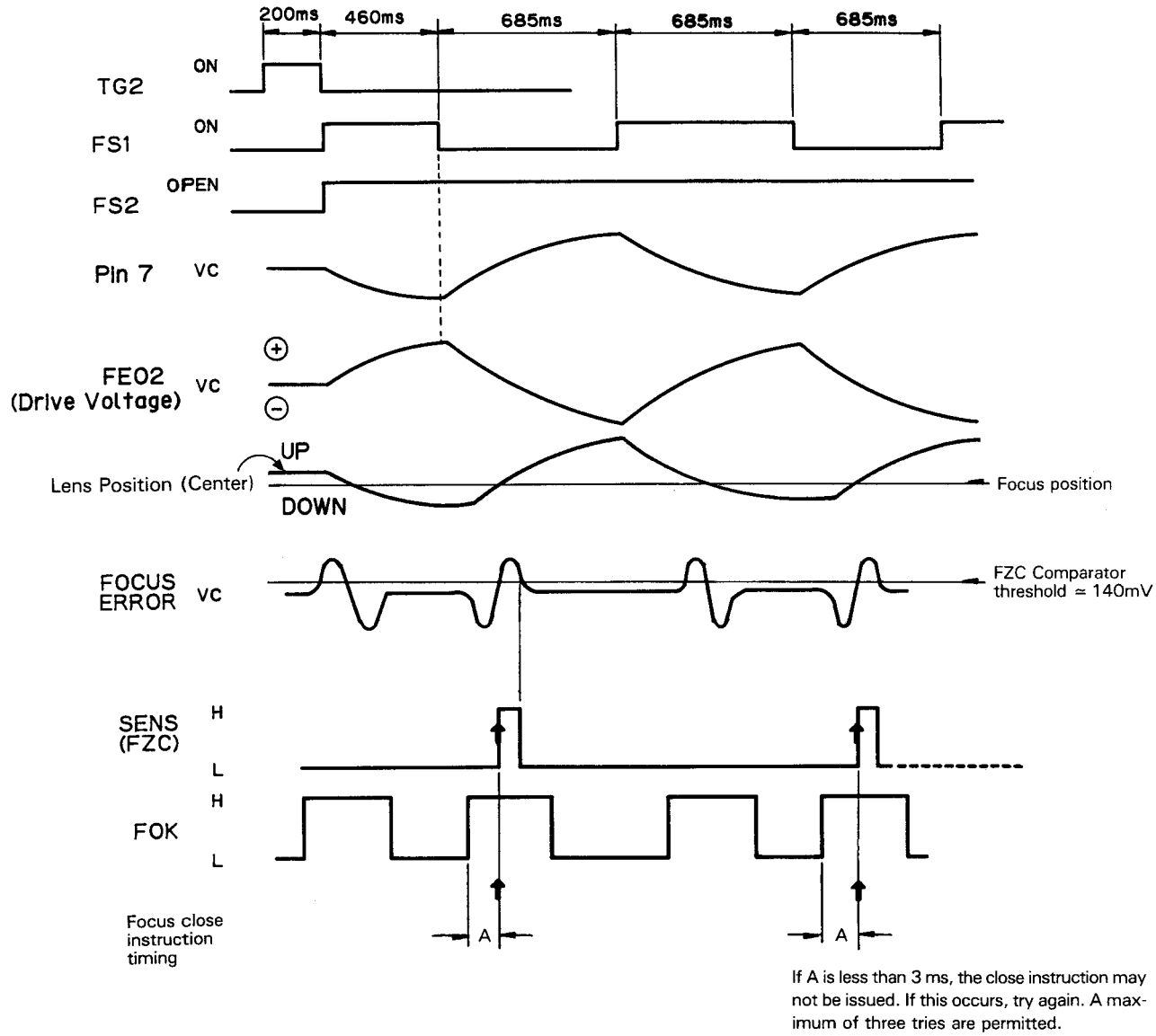


Fig. 28 Focus close timing chart

b) Focus equalizer
The CXA1082AQ IC incorporates a phase compensator (high end). The external compensator includes a band compensator equalizer in the FEO amplifier and a high f0 actuator compensator equalizer connected in series to obtain the required equalizer curve (see Figure 29).

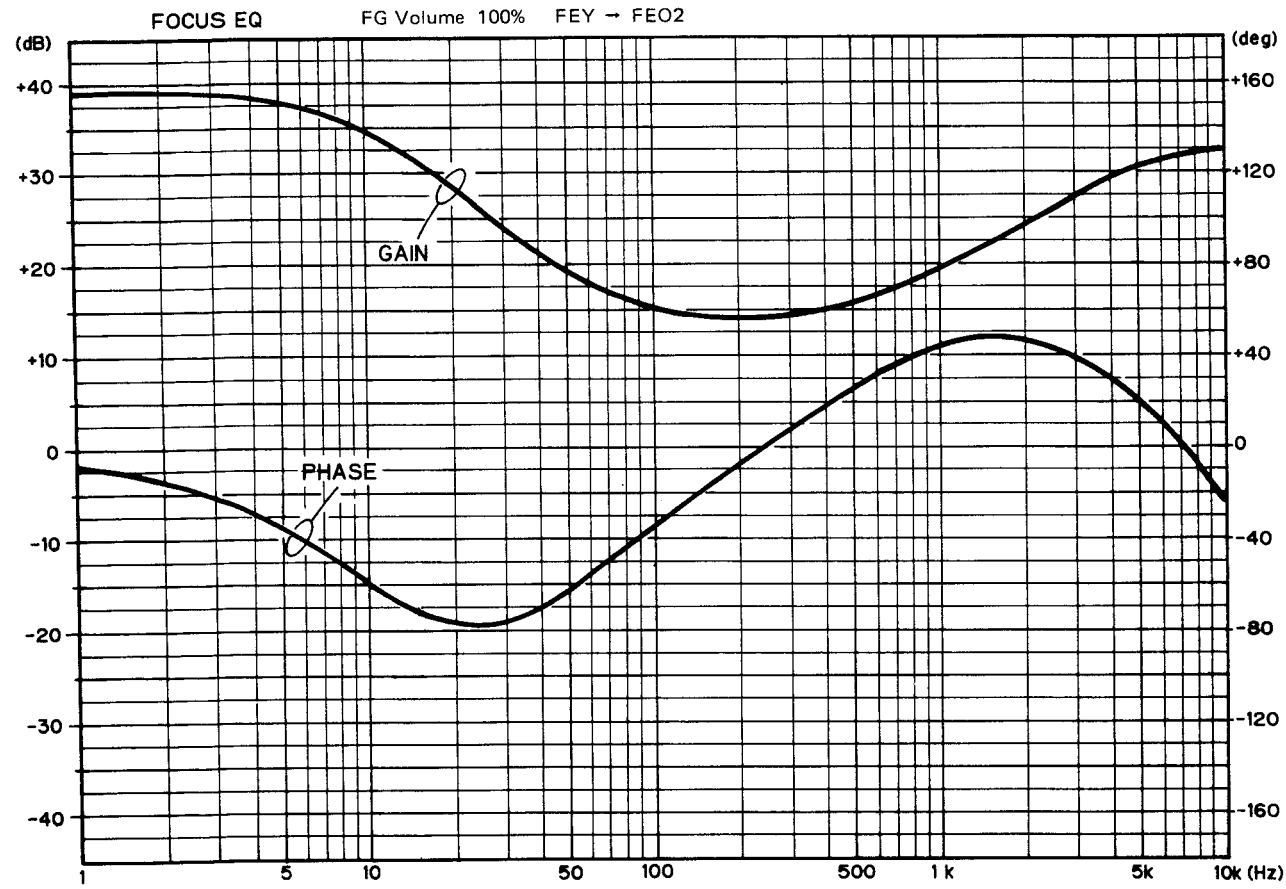


Fig. 29 Focus equalizer

(3) Tracking and Carriage Servos

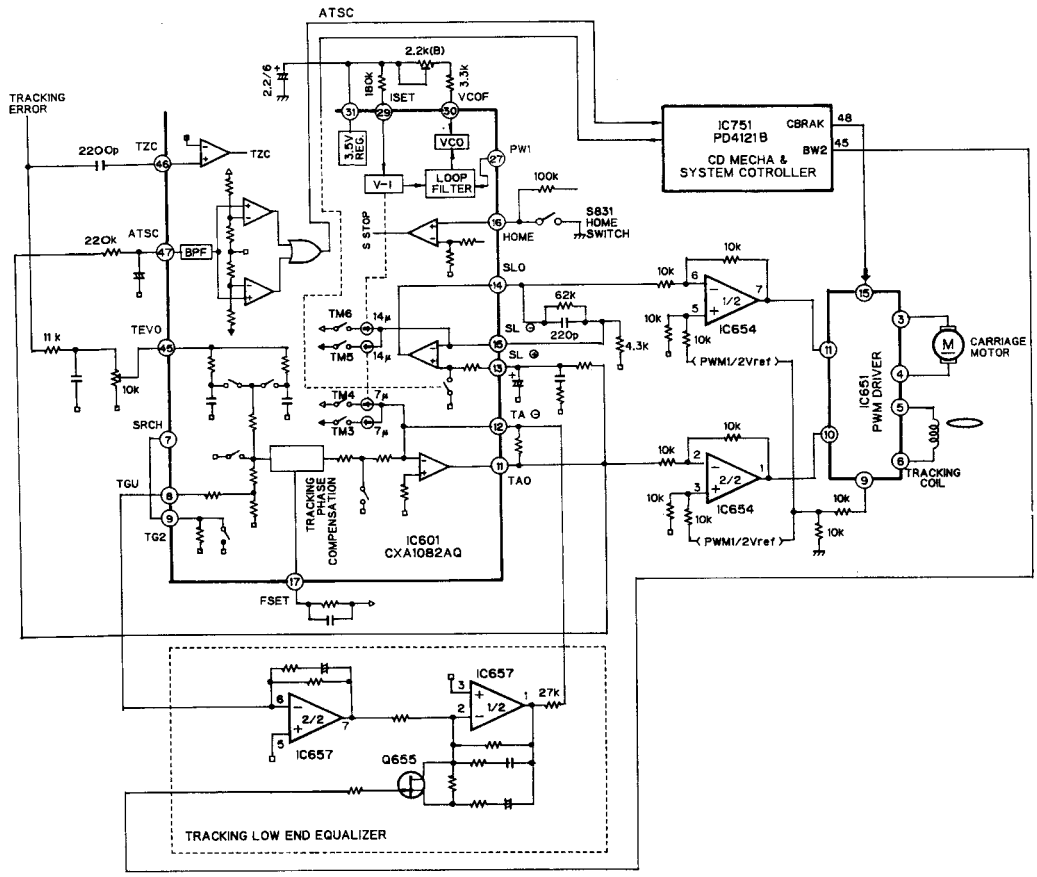


Fig. 30 Tracking, carriage servo system block diagram

The above diagram is a block diagram of the tracking and carriage servo system. At the same time that TM1 is switched ON to activate a forward or reverse tracking jump, TM3 and TM4 are switched ON and OFF. The voltage generated at pin 13 (TAO) is determined by the current passed through TM3 and TM4, and the pin 12 feedback resistance. That is,

Track jump peak voltage (TAO) = ISETi (tracking) × R_{TAO}
= 7[μA] × 82[kΩ] = 0.57[VC]

And at the same time that TM2 is switched ON to activate a forward or reverse carriage kick, TM5 and TM6 are switched ON and OFF. The voltage generated at pin 14 (SLO) is determined by the current passed through TM5 and TM6, and the pin 15 feedback resistance. That is,

Carriage kick voltage (SLO) = ISETi (carriage) × R_{SLO}
= 14[μA] × 62[kΩ] = 0.87[VC]

The polarity of pin 11 (TAO) is opposite to that of pin 45 (TEVO).

a) Tracking equalizer

This equalizer consists of a built-in phase compensator (high end) and a two-stage external low- end compensator connected in parallel with the former used as the main path and the latter as the side path. These signals are added at the TAO amplifier (pin 12) to obtain the required equalizer characteristics. Gain switching during playback and track searching is executed in the second side path stage. The BW2 switching signal is "H" during playback and "L" during track searches. ("H" is set to about 2.8V to ensure that Q655 is turned ON.)

Hence, gain is increased during track search to attain stable action. The tracking equalizer characteristics during playback and track search are shown in Figure 31.

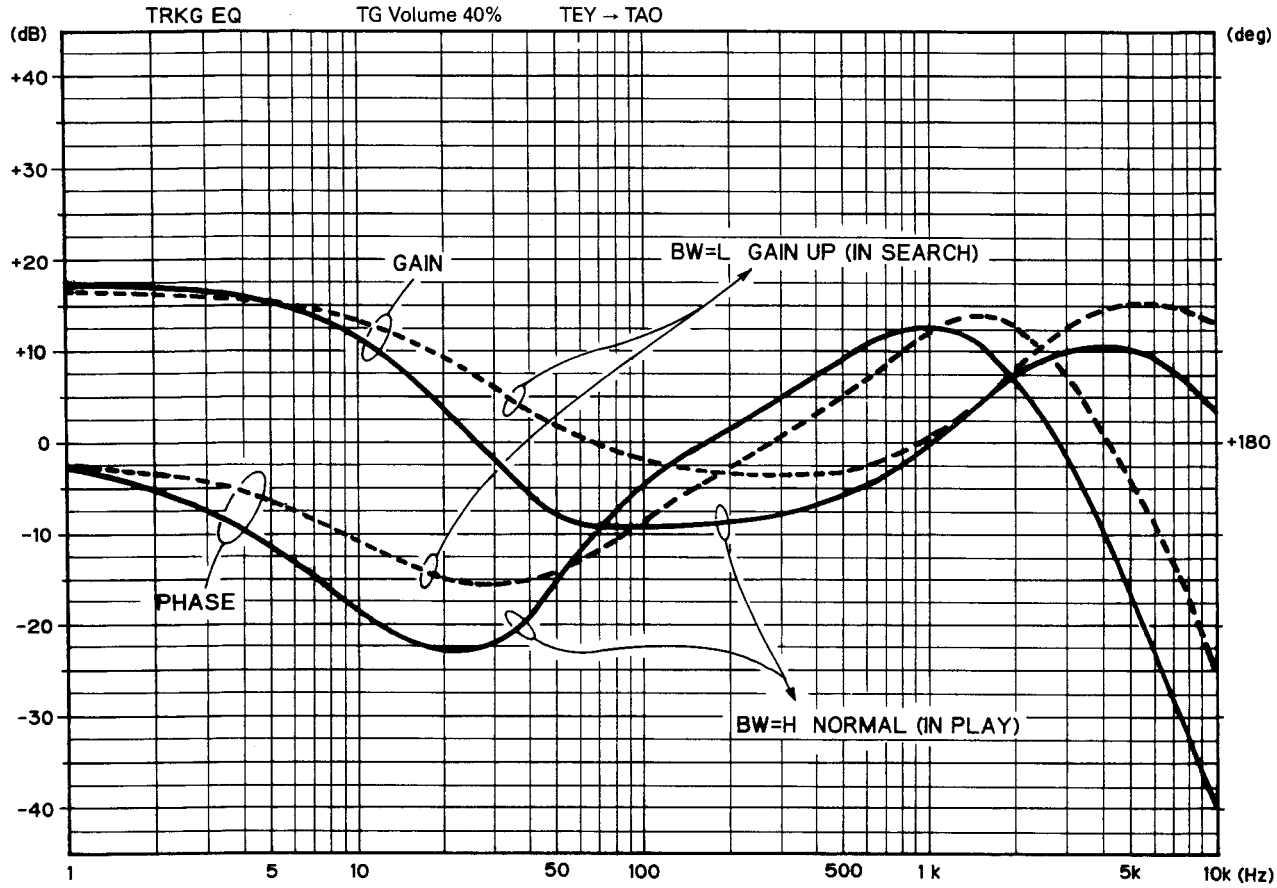
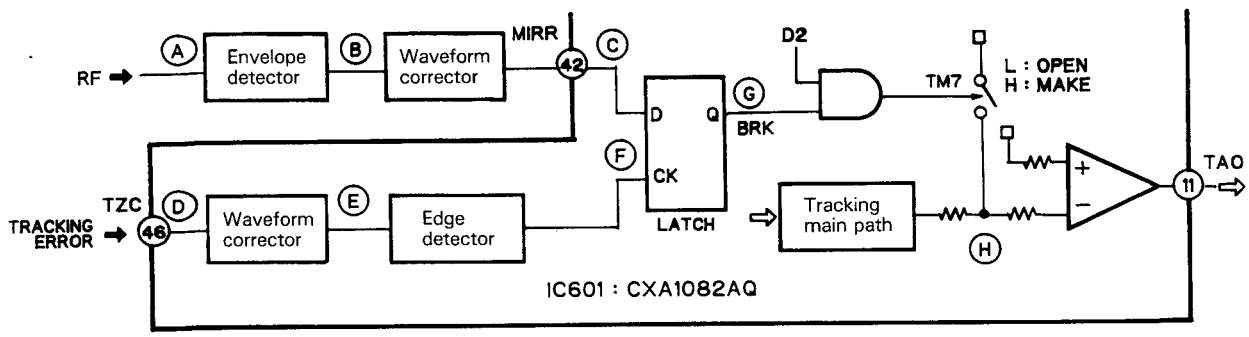


Fig. 31 Tracking equalizer

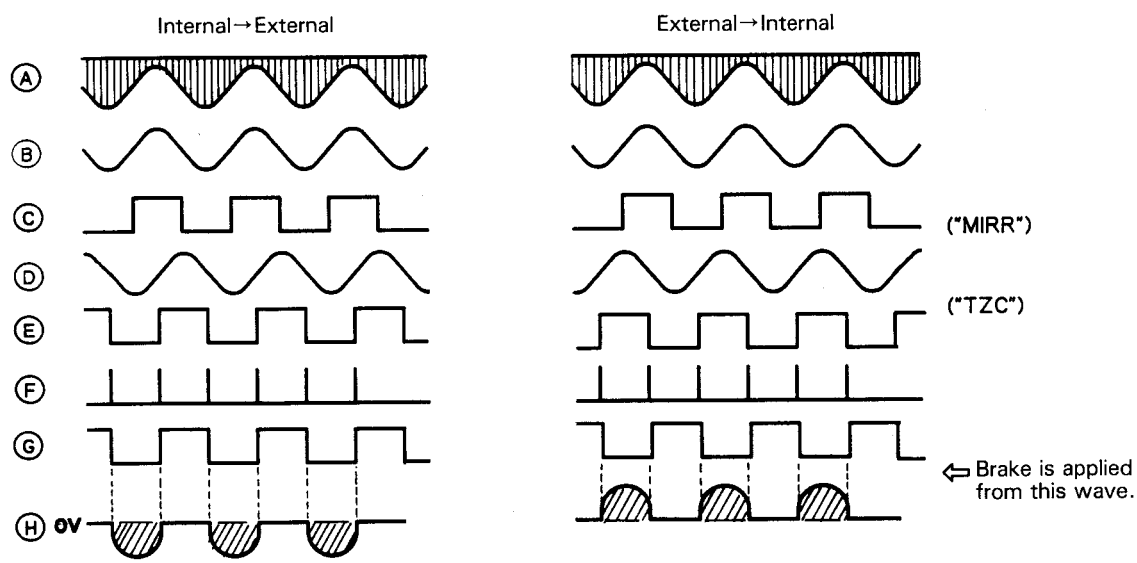
b) Brake mode circuit

Brake mode is used to execute tracking closure smoothly while the pick-up and disc are moving relatively to each other. The pick-up and disc directions are detected by the phase relationship between the envelope and tracking error at the RF, followed by switching which disengages the tracking error accelerating side so that only the decelerating side is used. This action is called brake mode, and can be controlled externally.

Brake mode is used when tracking is closed after focus-in is completed (and also when getting ON-track after a jump or track search). Hence, tracks which suffer from relatively large deviations due to eccentricity and other factors can be closed smoothly.



Operation of TM7 (brake circuit)



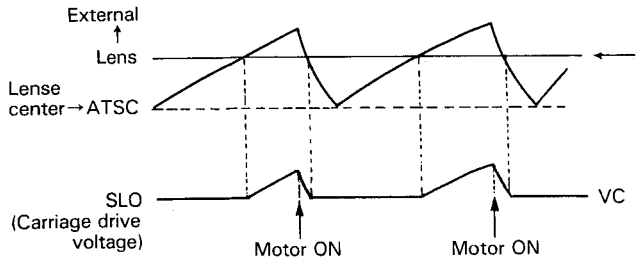
Wave forms

Fig. 32

c) Carriage equalizer

The carriage servo system generates components required for carriage feed from the equalizer characteristics shown in Figure 33 when the tracking actuator drive voltage TAO is applied.

Furthermore, the TAO low-pass filter output is applied to pin 47 (ATSC), and if the tracking actuator lens deflection is within ±25 tracks (ATSC ON), the carriage servo is switched OFF (TM2 ON), and the carriage motor is braked by shorting the motor terminals via the PWM driver (IC651). This prevents the motor from being activated by vibration. If lens deflection exceeds +25 tracks (ATSC OFF), the carriage servo is switched ON (TM2 open), and drive is applied smoothly to the pin 14 SLO output by the slow rise controlled by the carriage equalizer time constant.



Conceptual Diagram of ATSC ON/OFF During Play
(Polarity differs from that of the system.)

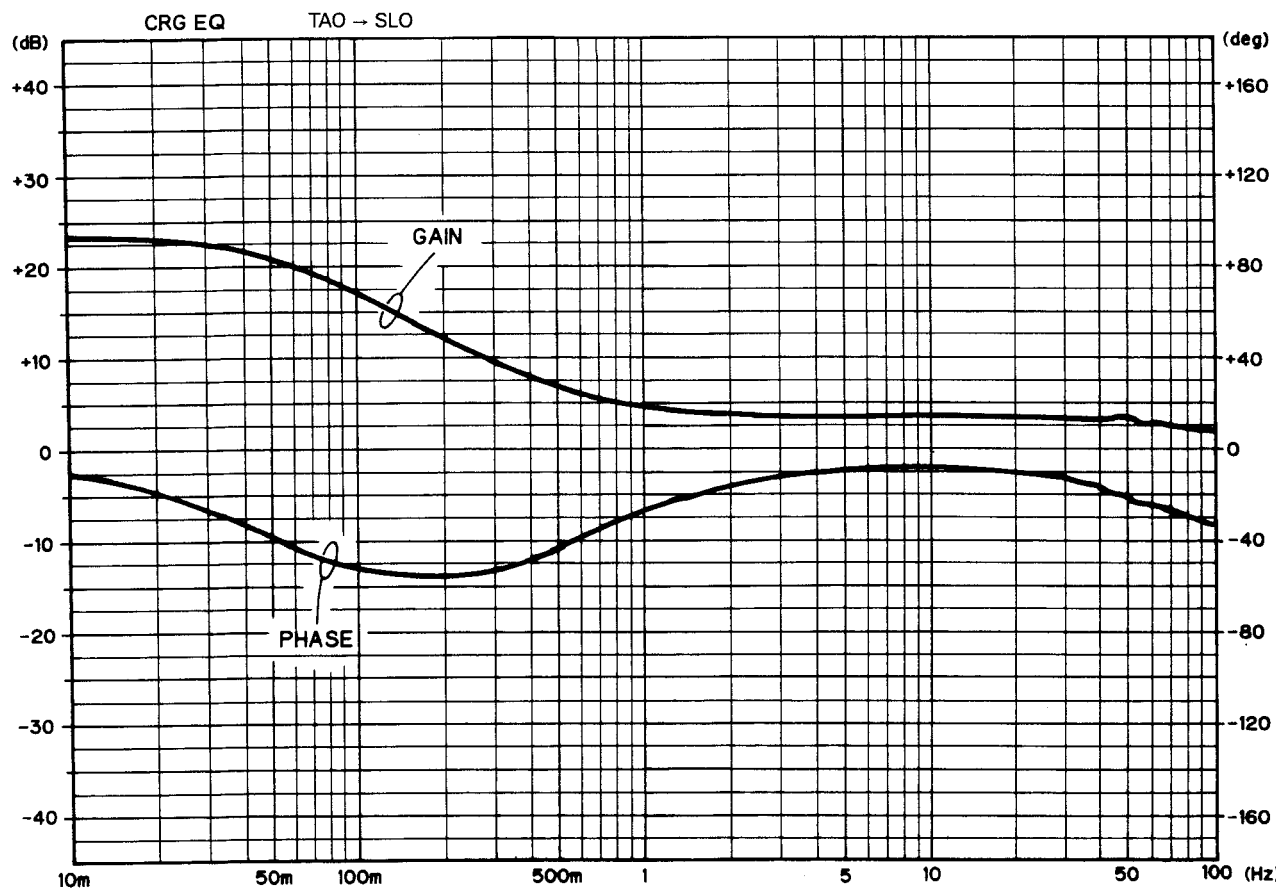


Fig. 33 Carriage equalizer

(4) Track jump

The CXA1082AQ auto sequencer enables tracks to be jumped 1, 10, 16, 32, 64, and 80 tracks at a time. Track searching is executed while reading sub-codes at every third group of 80 tracks.

With timing data from the system microcomputer transferred to the CXA1082AQ RAM in advance, tracks can be jumped by simple transfer of auto sequencer serial data. The auto sequencer timing charts for track jumps of 1, 10, and 2N tracks are shown in Figures 34 thru 36.

Time supervision of A thru D is executed by setting $5X in the system microcomputer. The settings used in this system are listed below.

A = 0.11 msec
B = 0.23 msec
C = 0.16 msec
D = 10 msec (2N = 80, 64)
7.3 msec (2N = 32, 16)

The auto sequencer is started by transferring the following $4X.

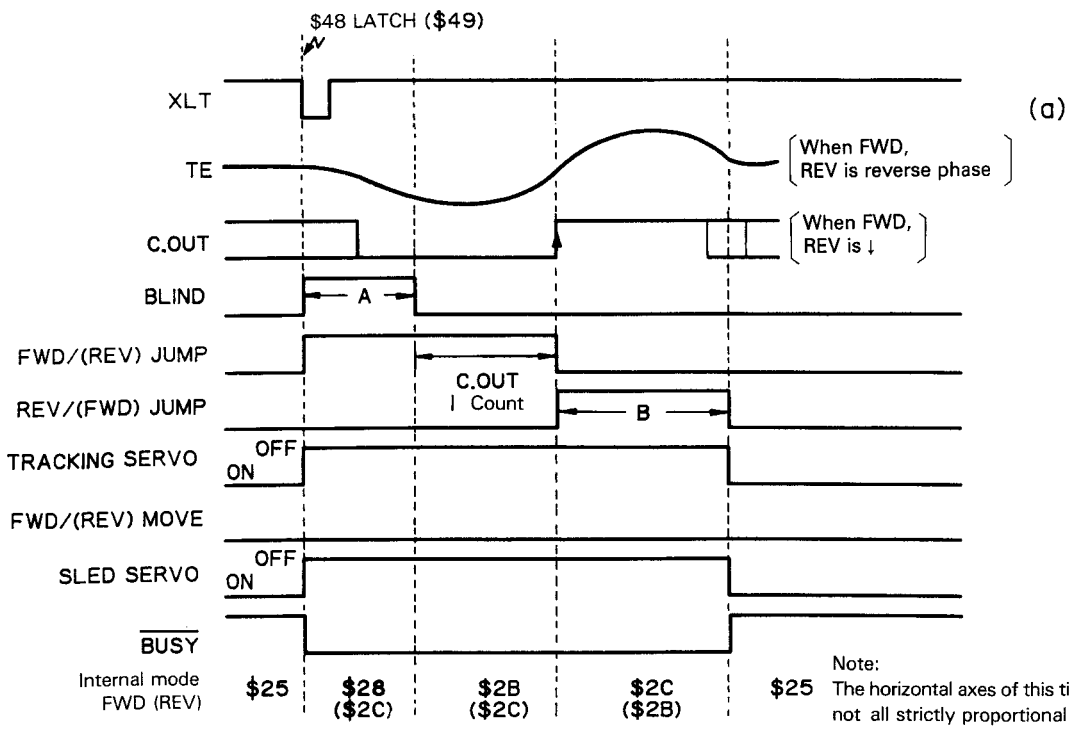
Auto sequencer

	AS3	AS2	AS1	AS0
CANCEL	0	0	0	0
FOCUS ON	0	1	1	1
1 TRACK JUMP	1	0	0	X
10 TRACK JUMP	1	0	1	X
2N TRACK JUMP	1	1	0	X

(2N = 16, 32, 64, and 80)
X=0 REVERSE
X=1 FORWARD

Auto Sequence Timing Chart

a) 1 Track Jump



Note:
The horizontal axes of this timing chart are not all strictly proportional to real time.

Fig. 34

b) 10 Track Jump

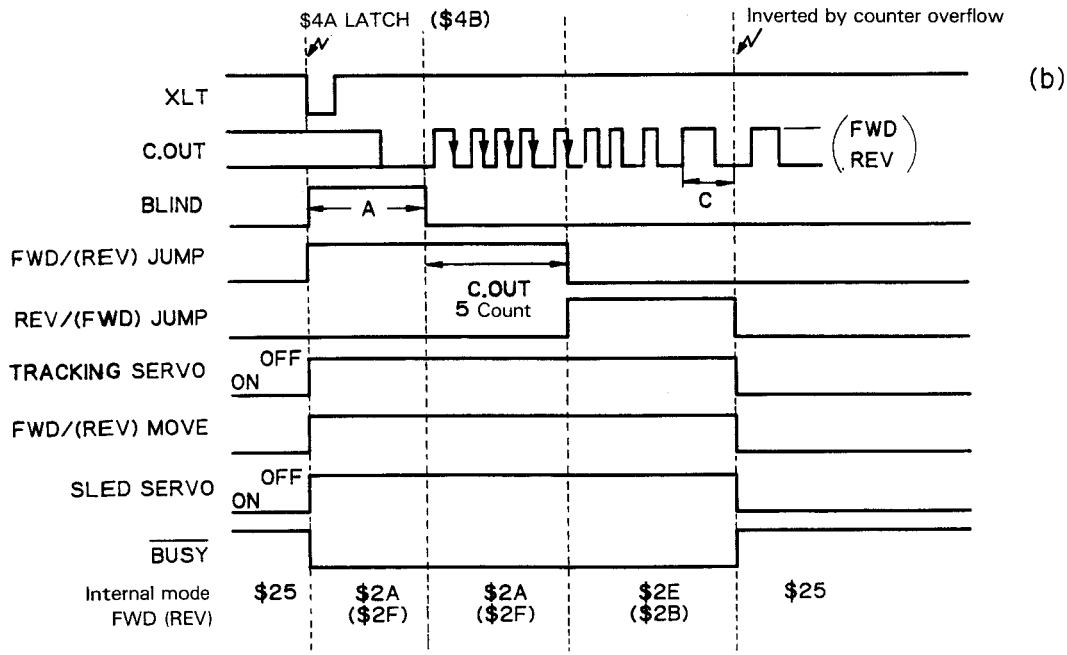


Fig. 35

c) 2N Track Jump (2N=16, 32, 80)

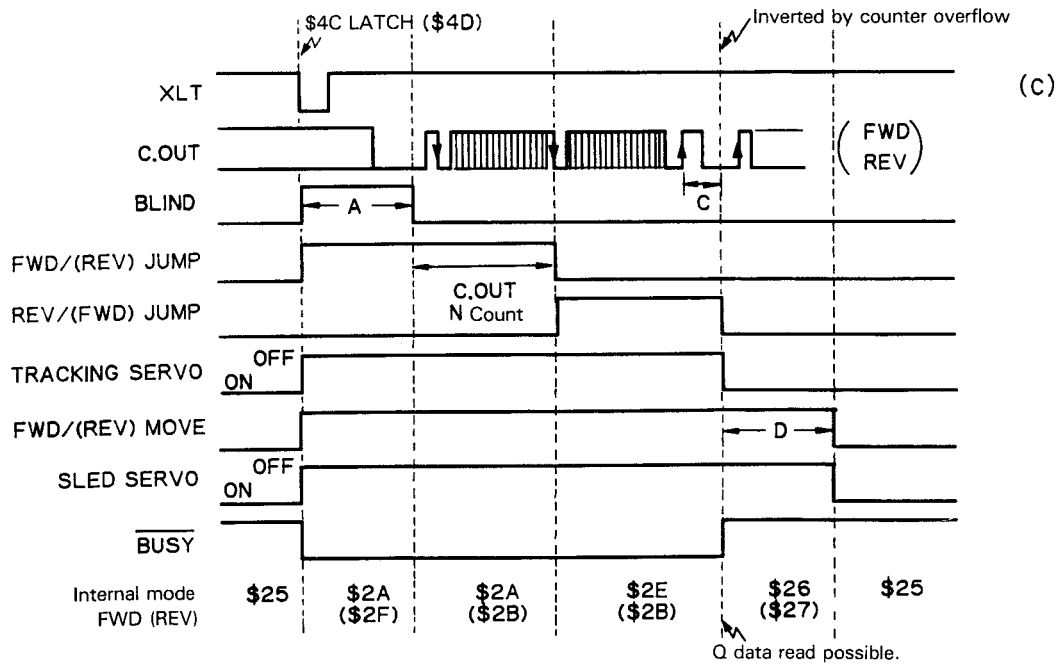


Fig. 36

3. CD Control Stage (IC751)

(1) CLV Control Commands and CLV Mode Commands

Register D

DIV	D3	0	RFCK/4 and WFCK/4	CLV-P mode phase comparator frequency
		1	RFCK/4 and WFCK/4	
T_B	D2	0	RFCK/32	CLV-S and CLV-H mode bottom hold cycle time
		1	RFCK/16	
T_P	D1	0	RFCK/4	CLV-S mode peak hold cycle time
		1	RFCK/2	
GAIN	D0	0	– 12dB	CLV-S and CLV-H mode MDP pin gain
		1	0dB	

Register E

Mode	D3-D0	MDP pin	MDS pin	FSW pin	MON pin
STOP	0000	L	Z	L	L
KICK	1000	H	Z	L	H
BRAKE	1010	L	Z	L	H
CLV-S	1110	CLV-S	Z	L	H
CLV-H	1100	CLV-H	Z	L	H
CLV-P	1111	CLV-P	CLV-P	Z	H
CLV-A	0110	CLV-S or CLV-P	Z or CLV-P	L or Z	H
CLV-A'	0101	CLV-S' or CLV-P	Z or CLV-P	L or Z	H

CLV mode command data table Z: High impedance

These signals are all CLV servo related. IC751 (mechanism/system controller) selects the respective CLV modes and passes the commands to IC701. The IC701 outputs include the MDP pin (speed and phase synchronization control), MDS pin (speed synchronization control), FSW pin (filter time constant switching), and the MON pin (motor ON/OFF switching control). Since these control pin outputs are modulated by pulse width, the signals are passed through a low-pass filter (incorporated in IC601) for conversion to DC signals before being applied to the PWM driver (IC652). The MON pin is connected to pin 15 of IC652. The spindle driver is activated when "H" is applied to this pin, but there is no output when "L" is applied. (This is to prevent the driver from being activated by offset of the IC601 SPDLO pin.)

- Stop mode

Stop mode enables the spindle motor to remain still during DD converter (IC951) operation. The IC701 outputs are MDP = "L", MDS' = "Z", FSW = "L", and MON = "L". Pin 39 (SPDLO) of IC601 is at 2.5V.

- Kick mode

Kick mode compels the spindle motor to rotate forward for simple PLL activation. Pin 39 (SPDLO) of IC601 is at 3.2 to 3.3V.

• Brake mode
When stopping the spindle motor during forward rotation, brake mode reduces the time taken to stop the motor by applying a reverse drive voltage. Pin 39 (SPDLO) is at 1.6 to 1.7V. During brake mode, the spindle motor is controlled by spindle sub-control.
• CLV-S mode
CLV-S mode is a "rough" servo mode used if the EFM- PLL circuit lock is disengaged during motor starting, track jumping, or track search.
• CLV-H mode
CLV-H mode is used if the RF signal becomes inter- ittent during high-speed searches. (Test mode only)
• CLV-P mode
CLV-P mode is the normal playback mode selected when the PLL is locked.
• CLV-A mode
When CLV-P mode becomes unstable due to vibration or disc scratches, or when several tracks are jumped, CLV-P mode is switched to CLV-S mode. After the PLL has been activated, CLV-S mode is automatically switched back to CLV-P mode. This CLV-A mode is not used.
• CLV-A' mode
The difference between CLV-A mode and CLV-A' mode lies in the "rough" servo. Whereas the CLV-A mode rough servo involves measurement of the EFM pattern by crystal, the CLV-A' mode rough servo involves measurement by the VCO instead of crystal. Otherwise, both modes are identical.

*** Normal mode**

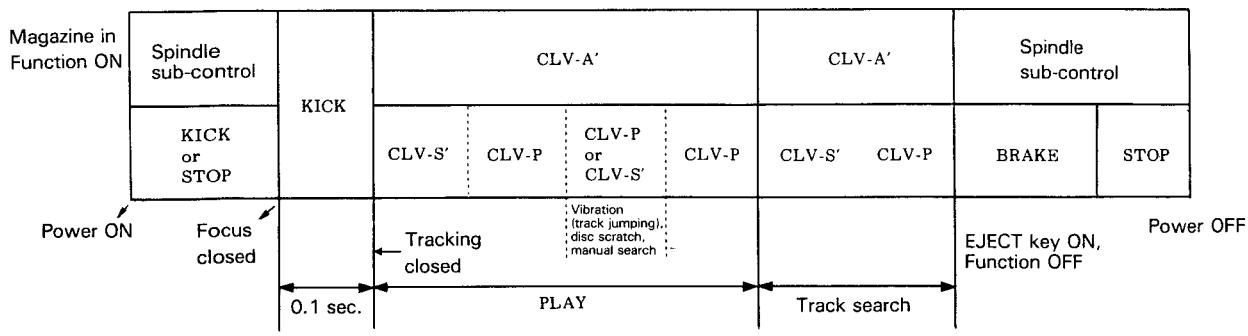


Fig. 37 Spindle motor control mode selection (Normal mode)

*** Test mode**

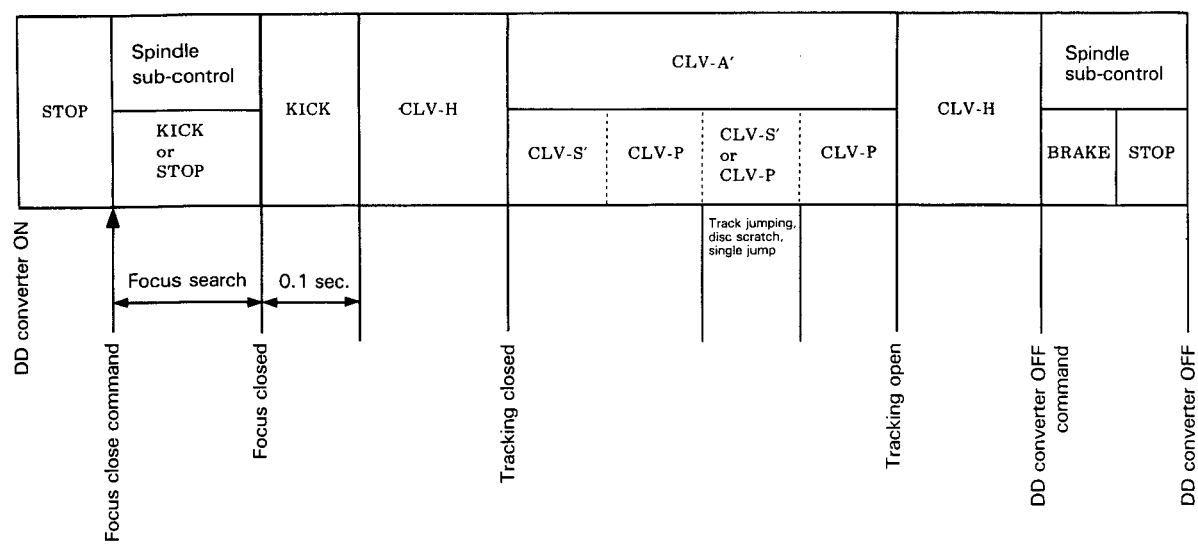


Fig. 38 Spindle motor control mode selection

4. Demodulator (IC701)

The demodulator consists of a single-chip LSI (CXD1135Q) connected to a number of peripheral circuits. The major functions are listed below.

1. Bit clock reproduction by EFM - PLL circuit
2. EFM data demodulation
3. Frame synchronizing signal detection, protection, and insertion
4. Powerful error detection and correction
5. Average value and previous hold value interpolation
6. Sub-code signal demodulation, and sub-code Q error detection
7. Spindle motor CLV servo
8. 8-bit tracking counter
9. Serial bus CPU interface
10. Built-in digital filter (35-stage)

5. D/A Converter (IC703)

The purpose of IC703 is to convert 16 bit serial data to left and right channel voltage signals. LRCK, BLCK, APTL, APTR, and DATA signals are received from IC701. 16 bits of input data from the logic interface stage are expanded and converted to 17 bits of data by a data conversion unit in the LSI. This data is divided into 8 upper and 9 lower bits used to control a switch connected to a resistance string. The respective outputs obtained with the divided data are combined, and the output then separated into left and right channels by using the APTL and APTR signals. These outputs are then passed via respective sample hold circuits to the LOUT and ROUT outputs.

6. Audio Stage

The IC703 output contains spectral components outside the audible frequency range. These components are removed by IC704 (low-pass filter: 0.8dB gain). This IC also includes a built-in de-emphasis circuit with the ON/OFF switching being controlled by applying + 5V and 0V respectively to pins 5 and 17. The ON/OFF status is read from disc sub-code with the output signal obtained from IC751. This output is driven by Q706 to control the de- emphasis pin. IC704 is also equipped with an isolator amplifier designed to cancel noise generated in the ground line of the connecting cable when CDX-M100 is connected to a cassette tape deck or other audio component. GIN is connected to drop the CDX-M100 GND to ground, and GOUT is connected to drop the cassette deck GND to ground. When CDX-M100 is used independently, measurements must be made with GIN and GOUT short-circuited.

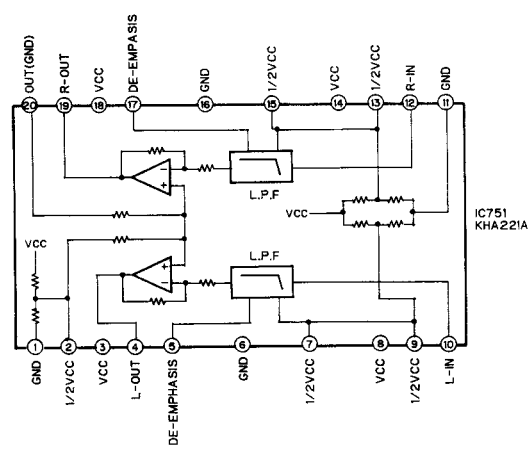


Fig. 39

7. Spindle Sub-control (SPC)

In this system, disc rotation must be controlled by another means until the disc reaches a certain speed and focus is achieved. Using the circuit shown in the Fig. 40, the spindle motor is controlled by simple means during focus search, and until the disc stops after the EJECT key is pressed and function is switched OFF.

The bridge circuit formed by R680, the spindle motor DCR, R678, and R679 is balanced while the spindle motor is stationary. One the spindle motor comences to rotate, a counter electromotive voltage which is inversely proportional to the rpm speed is generated in the motor, thereby upsetting the balance between points A and B. The potential at A becomes higher than that at B. As a result, the IC656 1/2, 2/2 comparator is changed to "H", this output (SPC) being passed to IC751 (mechanism/system controller). If SPC is "H", a STOP command is passed to IC701. SM− and SM+ (IC652) are connected to ground level during the stop interval, and (A) is compared with (C). If (A) is lower than (C), the comparator (SPC) is switched to "L", resulting in a KICK command being passed from IC751 to IC701. In this "rough" disc rotation control, the above process is repeated until focus is attained.

When stopping the disc, a brake signal is generated when the comparator is "H", but a stop signal is generated when the comparator is changed to "L", thereby braking the disc. Q652 is used to activate the brake adjustment resistor R692 while the brake is being applied. Q651 and Q653 apply a reset signal to this circuit. SPCO is "H" when braking. And although SPC is also active during normal playback and search operations, IC751 is not involved.

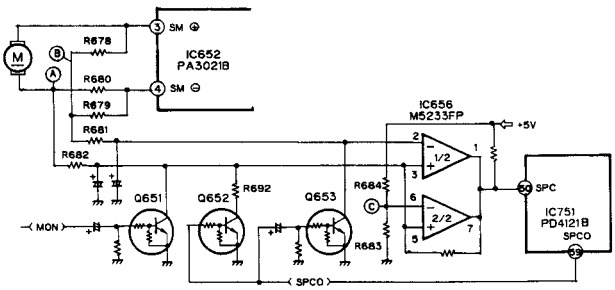


Fig. 40

Focus search and spindle sub-control

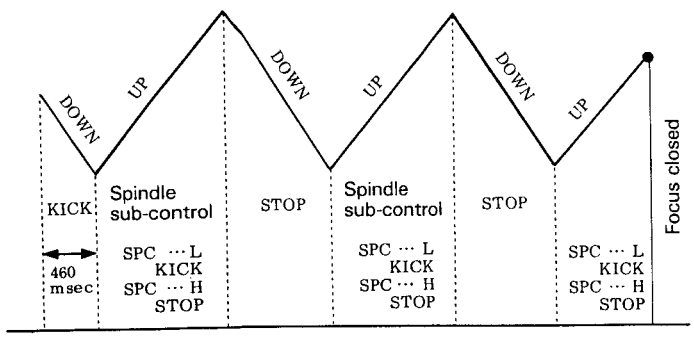


Fig. 41 Focus Search and Spindle Sub-control

8. VCO Loop Filter (8.64MHz VCO)

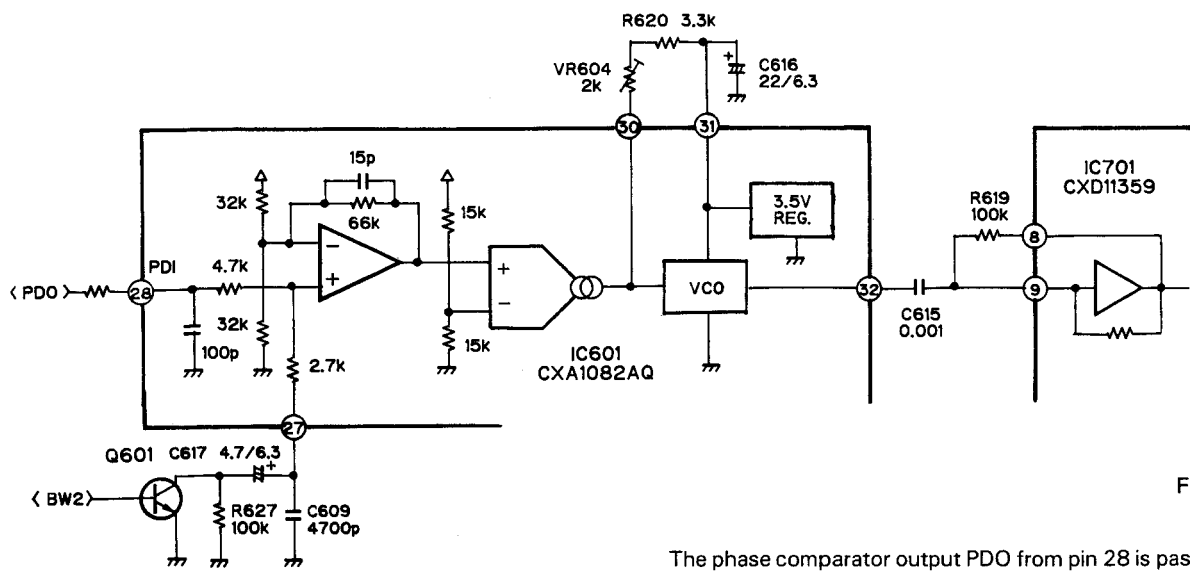


Fig. 42

The phase comparator output PDO from pin 28 is passed to the loop filter for removal of the PWM carrier prior to V- I conversion. This is then added to the free-run frequency setting current from pin 30 for use in VCO frequency control. The VCO free-run frequency is more or less inversely proportional to the resistance between pins 30 and 31.

9. Spindle Servo,LPF

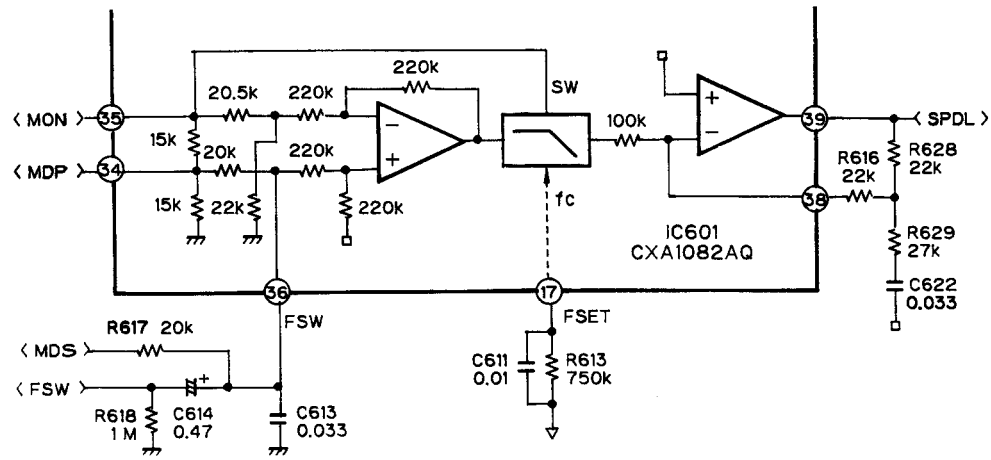


Fig. 43 Spindle servo, LPF

With a 2-stage low-pass filter consisting of the 200Hz LPF (0.033μF and 20 kΩ) connected to pin 36 and the internal LPF (fc to 200Hz with 510 kΩ connected to pin 17), the carrier components of the CLV servo error signals MDS and MDP are removed.

In CLV-S, -H mode, FSW = "L", and the fc of the low-pass filter connected pin 36 is lowered for greater filter effect.

5. ADJUSTMENT

1) Precautions

- Unlike other CD players, the CDX-M100 uses a single power supply (+5V) for the DD converter. The signal reference potential, therefore, is connected to pin no.14 (approx. 2.5V) of IC351 (CXA1081M) instead of GND. (VC or VREF at test point)

If VC and GND are connected to each other by mistake during adjustments, not only will it be impossible to measure the potential correctly, but the servo will malfunction and a severe shock will be applied to the pick-up. To avoid this, take special note of the following.

Do not connect the negative probe of the measuring equipment to VC and GND together. It is especially important not to connect the channel 1 negative probe of the oscilloscope to VC with the channel 2 negative probe connected to GND.

And since the frame of the measuring instrument is usually at the same potential as the negative probe, change the frame of the measuring instrument to floating status.

If by accident VC comes in contact with GND, immediately switch the DD converter or power OFF.

- Always make sure the DD converter is OFF when connecting and disconnecting the various filters and wiring required for measurements.
- Before proceeding to further adjustments and measurements after switching DD converter ON, let the player run for about one minute to allow the circuits to stabilize.
- When loading and unloading discs during adjustment procedures, always wait for the disc to be properly clamped or ejected before pressing the another key. Otherwise, there is risk of the actuator being destroyed. (For example, do not press the [P.G] key while a disc is being moved from magazine to clamp after DD converter is switched ON in steps 3 thru 5 of Tracking Balance Adjustment I. Nor should the [EJECT] key (in M100) be pressed during focus closed status.)

2) Since CDX-M100 is used in combination with a multi-CD control section such as KEX-M700, all adjustment key operations are executed at that control section.
The KEX-M700 test mode starting procedure and key operations are included for reference purposes. All keys mentioned in the main text are KEX-M700 keys.

- Test mode starting procedure
Switch back-up ON or press the CLEAR button while pressing the VOL + and VOL − keys together.
- Test mode cancellation
Press the CDX-M100 CLEAR button, followed by the KEX-M700 CLEAR button. (Or switch the KEX-M700 and CDX-M100 back-up OFF.)

• Flow Chart

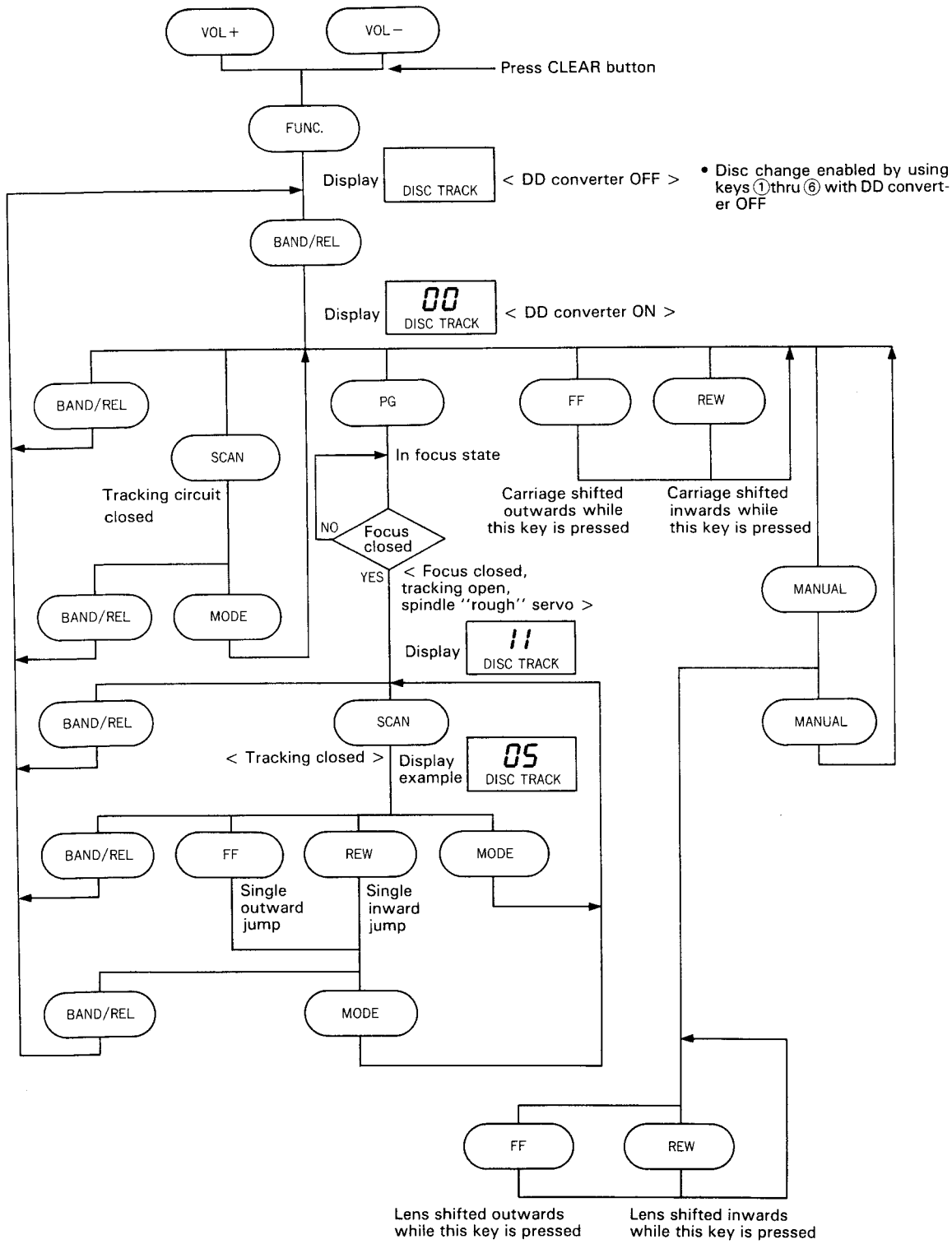


Fig. 44

- **Adjustment Points**

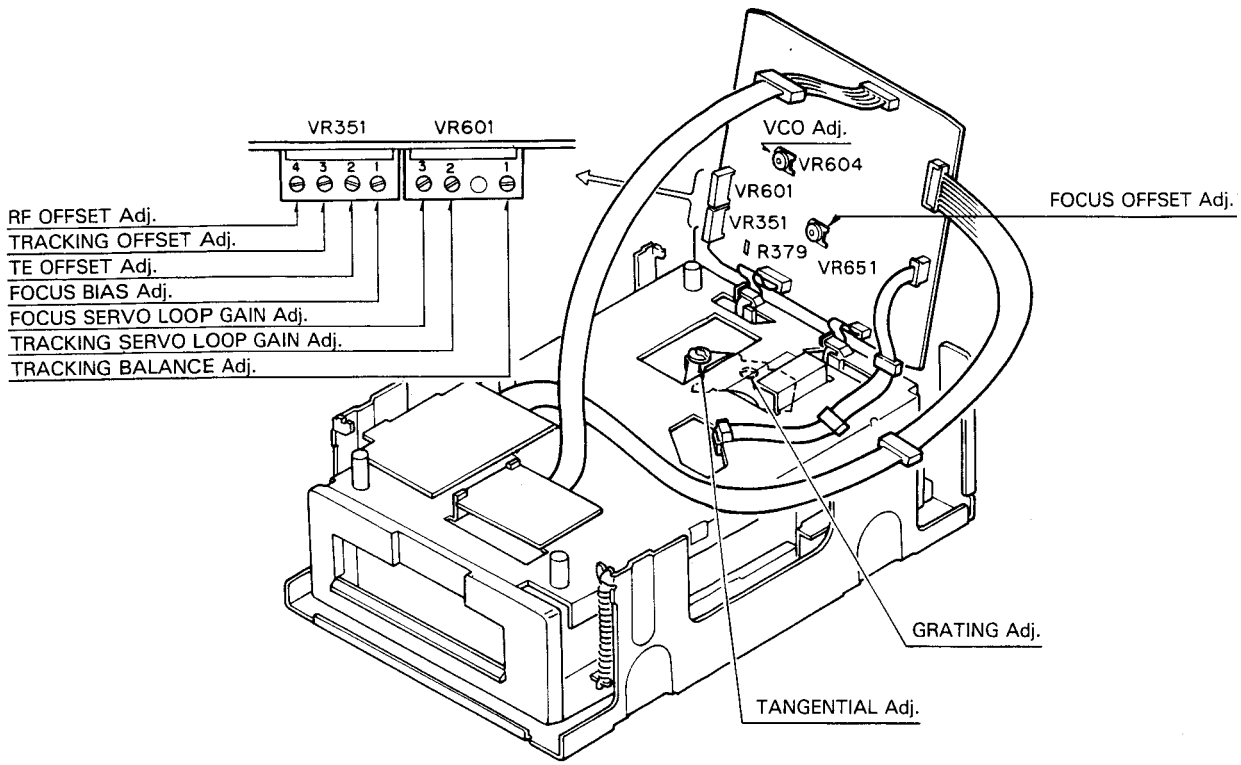


Fig. 45

5.1 Focus Offset Adjustment

● Purpose: To adjust the electrical offset of the focus amplifier to zero.

● Maladjustment symptoms: No focus closing

● Measuring equipment/ jigs	• Multi-meter or oscilloscope
● Measuring point	• FEO2
● Test disc and setting	• Empty magazine, test mode
● Adjustment position	• VR651

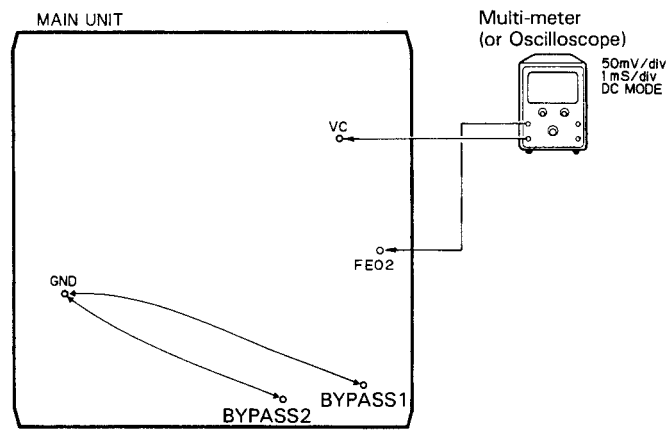


Fig. 46

Adjustment Procedure

1. Connect BYPASS 1 and BYPASS 2 to GND.
2. Switch DD converter ON.
3. Using VR651, adjust the FEO2 DC voltage in reference to VC to a value of 0 ± 25mV.

5.2 VCO Free Run Frequency Adjustment

● Purpose: To adjust the EFM decoder reference clock free- run frequency to a suitable value

● Maladjustment symptoms: Spindle lock not possible, distorted sound or no sound at all

● Measuring equipment/ jigs	• Frequency counter, extension cables (three types)
● Measuring point	• Pin no.70 ($\overline{\text{PLCK}}$) of IC701 (CXD1135Q)
● Test disc and setting	• Empty magazine • Test mode
● Adjustment position	• VR604

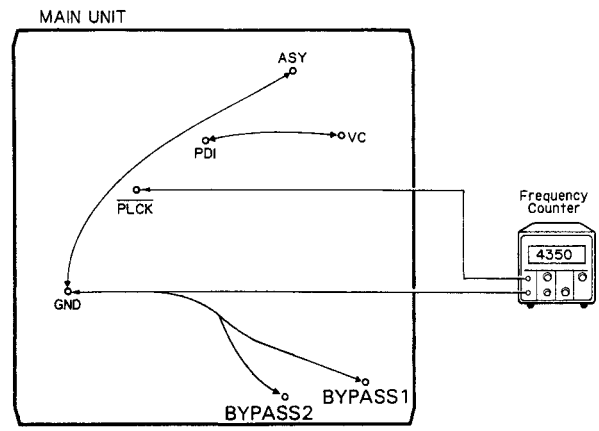


Fig. 47

Adjustment Procedure

1. Connect pin no.26 (TP ASY) of IC351 to GND. Connect BYPASS 1 and BYPASS 2 to GND.
2. Connect pin no.1 (TP VC) of IC601 to pin no.28 (TP PDI).
3. Switch DD converter ON while in test mode.
4. Connect the frequency counter to pin no.70 (TP $\overline{\text{PLCK}}$) of IC701 (CXD1135Q).
5. Adjust VR604 to obtain a frequency of 4.35 ± 0.005MHz.
6. Switch DD converter OFF.
7. Disconnect the leads connecting TP VC to TP PDI, and TP ASY to GND.

Note: Connect TP VC and TP PDI with leads kept as short as possible.

Note: Connect the frequency counter ground to TP GND as shown in the figure.

5.3 RF Offset Adjustment

● Purpose: To adjust the RF amplifier offset to a suitable value

● Maladjustment symptoms: Focus closure fails readily

● Measuring equipment/ jigs	• Oscilloscope
● Measuring point	• RFO
● Test disc and setting	• Empty magazine • Test mode
● Adjustment position	• VR351-4 (RFO)

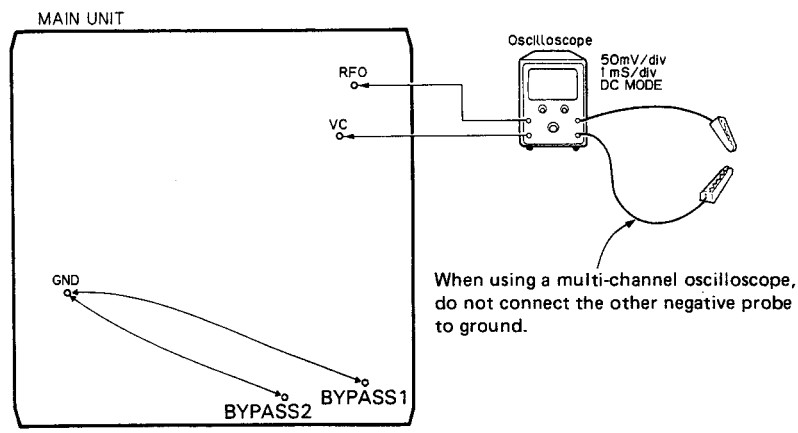


Fig. 48

Adjustment Procedure

1. Connect BYPASS 1 and BYPASS 2 to GND.
2. Switch DD converter ON.
3. Using the oscilloscope, measure the RFO DC voltage in reference to VC, and adjust VR351-4 (RFO) to obtain a reading of +250 ±25mV.

5.4 Tracking Offset Adjustment

● Purpose: To adjust the electrical offset of the tracking amplifier to zero

● Maladjustment symptoms: Search times too long, carriage run-away

● Measuring equipment/ jigs	• Oscilloscope
● Measuring point	• TAO low-pass filter output
● Test disc and setting	• Empty magazine • Test mode
● Adjustment position	• VR351-3 (TO)

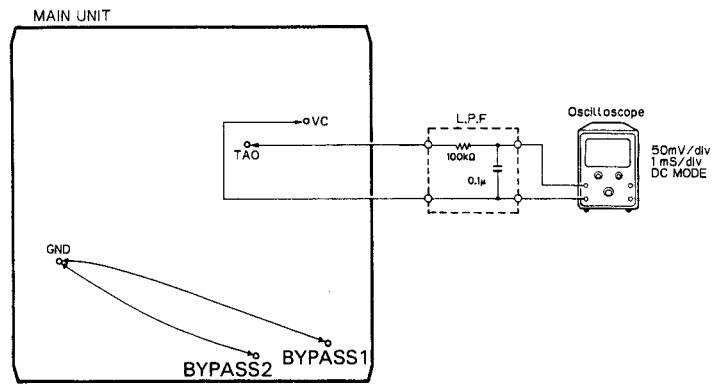


Fig. 49

Adjustment Procedure

1. Insert a low-pass filter between TAO and VC.
2. Check that BYPASS 1 and BYPASS 2 are connected to GND.
3. Switch DD converter ON.
4. Using the oscilloscope, measure the TAO LPF output DC voltage in reference to VC, and adjust VR351-3 (TO) to obtain a reading of 0 ±25mV.
   The low-pass filter may be left in place for later adjustments.

5.5 TE Offset Adjustment - I

● Purpose: To adjust the electrical offset of the tracking servo to zero.

● Maladjustment symptoms: Search times too long, carriage run-away

● Measuring equipment/ jigs	• DC voltmeter
● Measuring point	• TAO low-pass filter output
● Test disc and setting	• Empty magazine • Test mode
● Adjustment position	• VR351-2 (TEO)

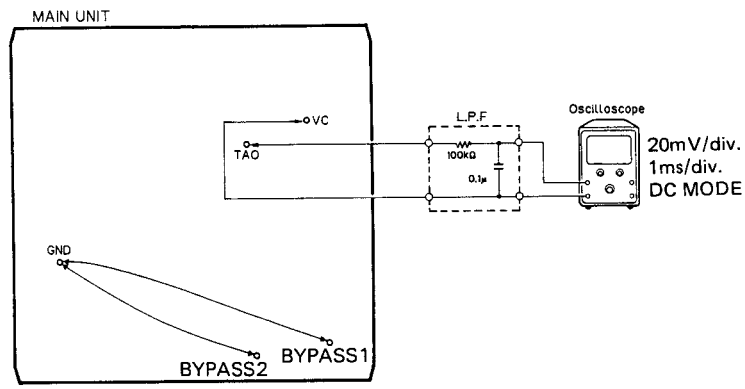


Fig. 50

Adjustment Procedure

1. Check that BYPASS 1 and BYPASS 2 are connected to GND.
2. Switch DD converter ON while in test mode.
3. Press the [SCAN] key to close tracking.
4. Using VR351-2 (TEO), adjust the TAO LPF output DC voltage in reference to VC to a value of 0 ± 10mV.
5. Switch DD converter OFF.

5.6 Tracking Balance Adjustment-I

● Purpose: To adjust the tracking servo offset to zero.

● Maladjustment symptoms: Search times too long, poor playability, carriage run-away

● Measuring equipment/ jigs	• Oscilloscope
● Measuring point	• TEY (Tracking error signal), low-pass filter output
● Test disc and setting	• SONY TYPE 4 (or TYPE 3) • Test mode
● Adjustment position	• VR601-1 (T. BAL)

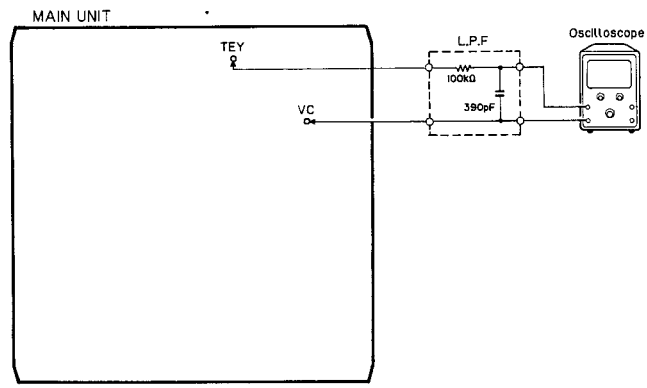
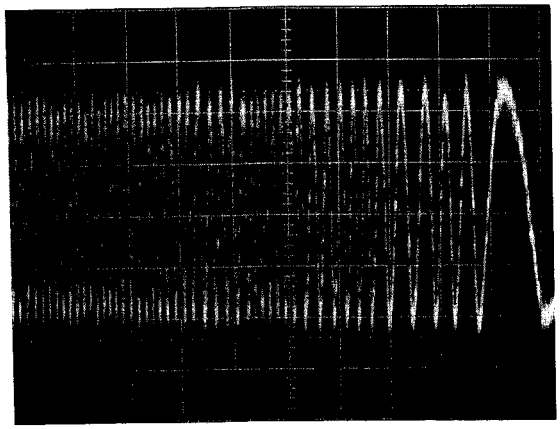


Fig. 51

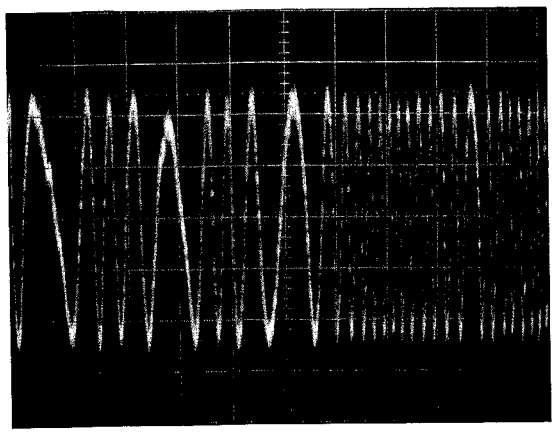
Adjustment Procedure

1. After checking that DD converter is OFF, connect the low-pass filter as shown in the diagram.
2. Disconnect BYPASS 1 and BYPASS 2 from ground.
3. Set the test disc (SONY TYPE 4) in magazine tray 6 and load the magazine. Switch DD converter ON.
4. Using the [FF] or [REW] key, move the pick-up to about the center of the signal surface.
5. Press the [PG] key to close focus.
6. Using an oscilloscope, observe the TEY signal in respect to VC. Then adjust VR601-1 (T.BAL) to set the positive and negative amplitudes to the same levels. (See Fig. 52-54.)
7. Switch the power OFF.
   The low-pass filter may be left in place for later adjustments.



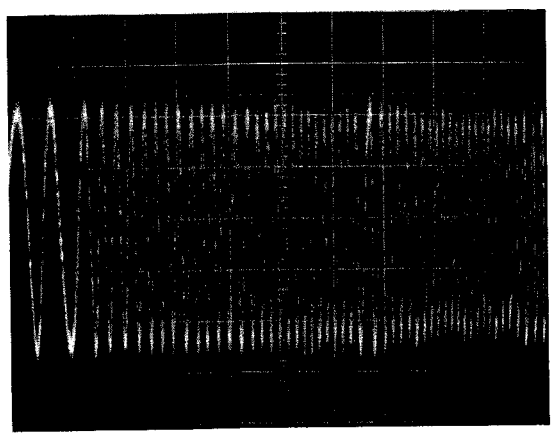
+5% NG

Fig. 52



±0% OK

Fig. 53



−5% NG

10ms/div.
0.2V/div.
DC Mode

Fig. 54

5.7 Tangential Skew Check

● Purpose: To check whether tangential skew has been misaligned or not when replacing the pick-ip unit.

● Maladjustment symptoms: No disc playback; track jumping

● Measuring equipment/ jigs	• Oscilloscope, extension connectors (three types), screwdriver
● Measuring point	• RFO
● Test disc and setting	• SONY TYPE 4 (or TYPE 3) • Normal mode
● Adjustment position	• Pick-up tangential adjustment screw

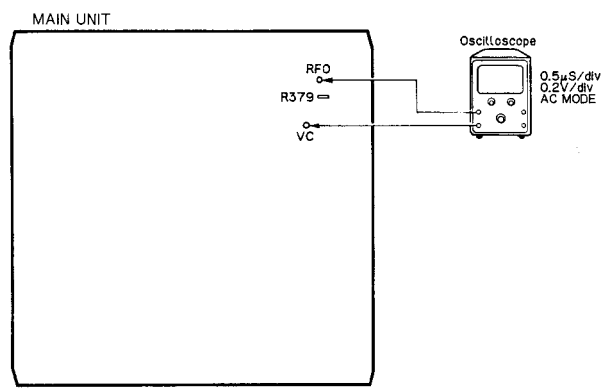
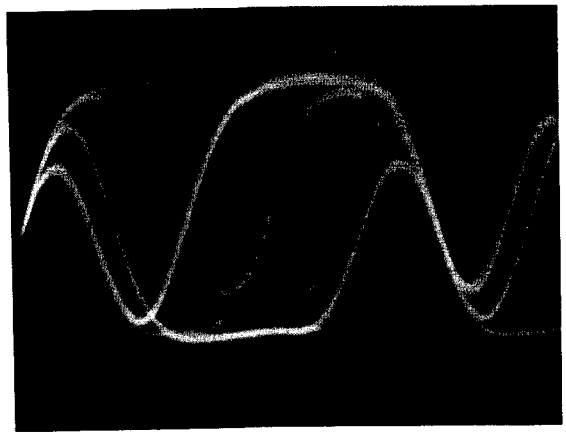


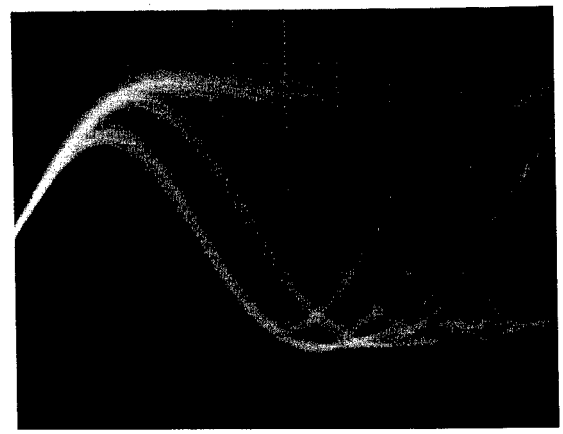
Fig. 55

Adjustment Procedure (with R379 removed)

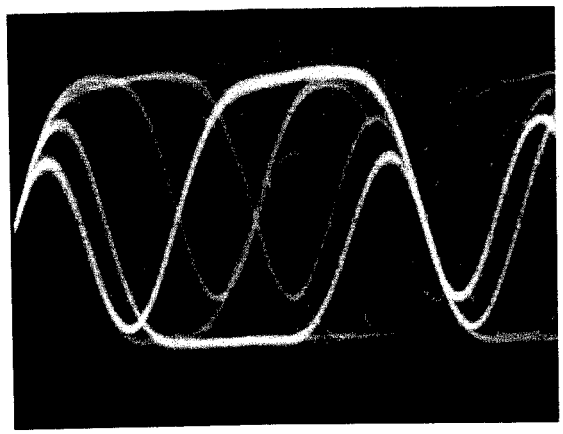
1. Remove R379 (but reconnect after completing adjustment).
2. Play tune TNO 7 in normal mode. (TYPE 3: TNO 23)
3. Check that the valley at the 11T section of the RF waveform is flat.
4. If out of adjustment, readjust to obtain a flat RF waveform. (See Fig. 56-61) Take care not to knock the pick-up with the screwdriver at this stage. (This kind of accident can result in loss of focus.)
5. Switch the power OFF and reconnect R379.
6. Apply "screw-lock" to the tangential adjustment screw.
7. After adjusting tangential skew, also adjust the grating.
8. If tangential skew is seriously out of adjustment, carriage stopping and run-away tend to occur in normal mode. In this case,
   a) Switch to test mode,
   b) Shift the pick-up to signal surface center using [FF] or [REW] key,
   c) Press the [PG] key to close focus.
   d) Press the [SCAN] key to close tracking.
   e) Observe RFO in respect to VC, and turn the tangential adjustment screw to obtain a flat waveform at the 11T section.
   f) Repeat the adjustment resuming from step 2.



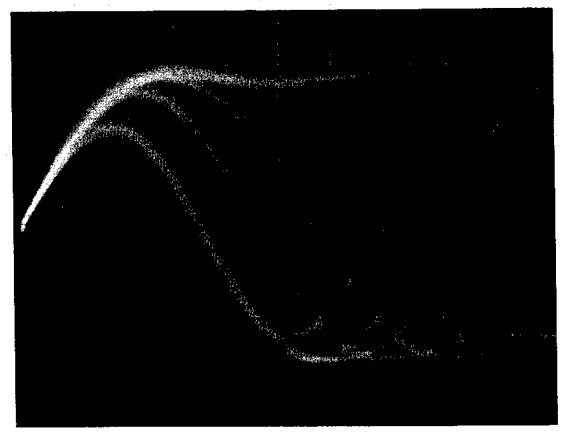
NG Fig. 56



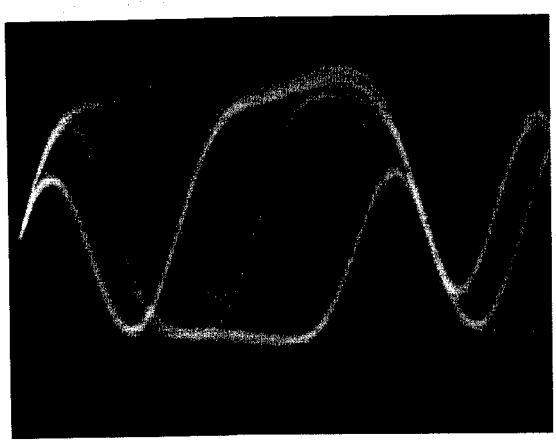
NG Fig. 57



OK Fig. 58

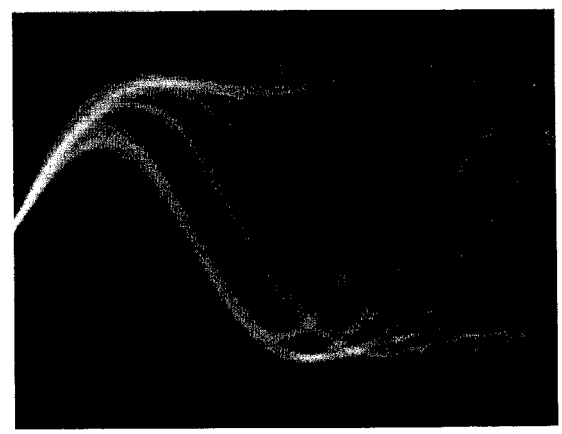


OK Fig. 59



NG Fig. 60

Play tune TN0 7 (TYPE4)

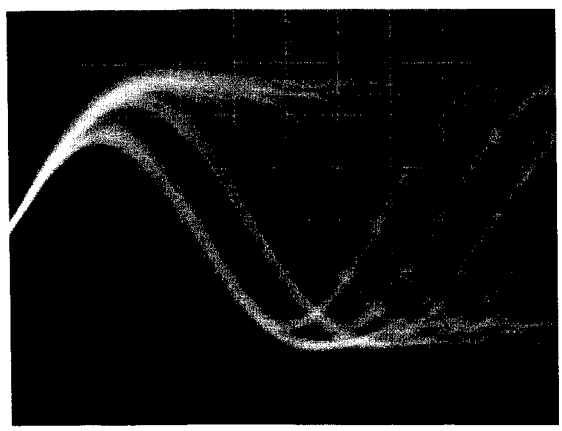


NG Fig. 61

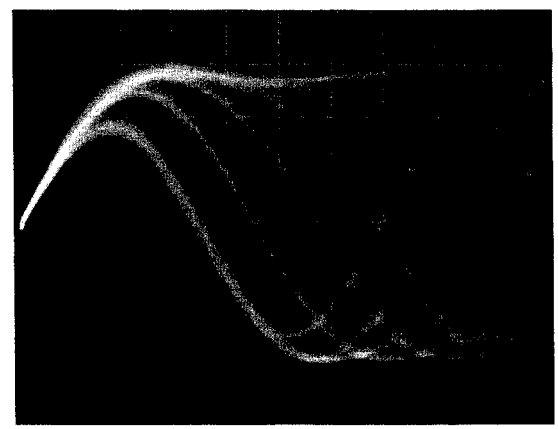
Play tune TN0 12 (TYPE4)

Adjustment Procedure (without R379 removed)

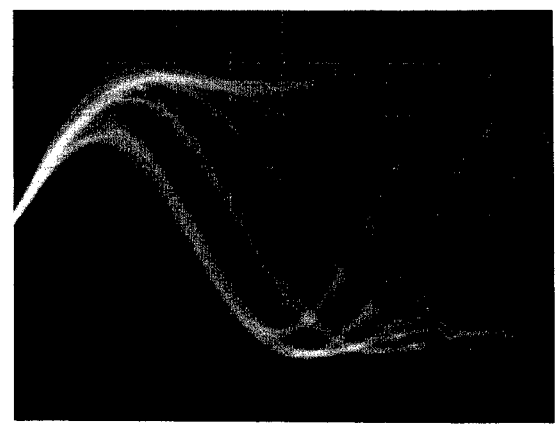
1. Play tune TNO 12 in normal mode. (TYPE 3: TNO 14)
2. Turn the tangential adjustment screw to obtain a good RF waveform eye pattern. Turn the adjustment screw both clockwise and counterclockwise to points where the eye pattern deteriorates, and take the midway point as the adjustment point. As a general guide, look for an overall clear waveform, and one of the diamond shapes in the eye pattern. The diamond shapes should appear in fine lines at the point of optimum adjustment. Take care not to knock the pick-up with the screwdriver at this stage. (This kind of accident can result in loss of focus.) (See Fig. 62-64)
3. Apply "screw-lock" to the tangential adjustment screw.
4. After adjusting tangential skew, also adjust the grating.



NG Fig. 62



OK Fig. 63



NG Fig. 64

5.8 Grating Adjustment

● Purpose: The grating may need adjustment in a replaced pick-up assembly.

● Maladjustment symptoms: No disc playback; track jumping

● Measuring equipment/ jigs ● Measuring point ● Test disc and setting ● Adjustment position	• Oscilloscope, clock driver, grating adjustment filter (bandpass filter), AC millivoltmeter, two low-pass filters • TEY, E LPF output, F LPF output • SONY TYPE 4 (or TYPE 3) • Test mode • Pick-up grating adjustment hole

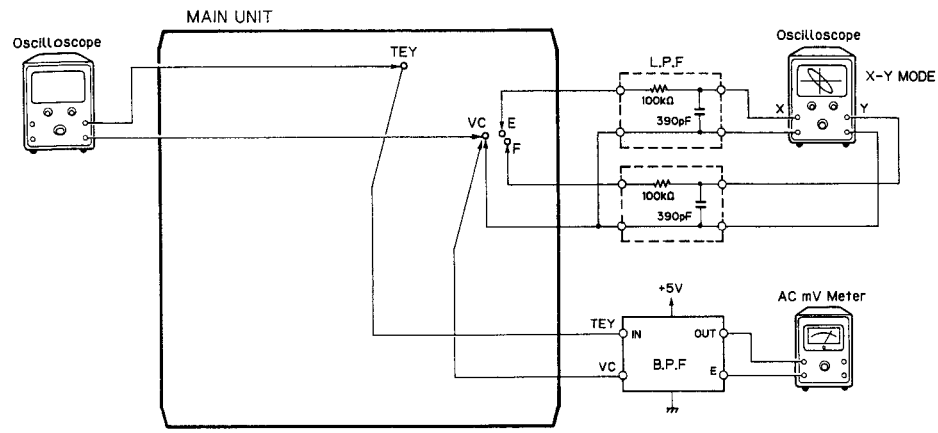


Fig. 65

Adjustment Procedure

1. Connect a low-pass filter (100k, 390p) to test points E, F, and VC as shown in the above diagram.
2. Switch DD converter ON in test mode, and load a disc.
3. Press the [PG] key to close focus.
4. Press the [SCAN] key to close tracking.
5. Using the [FF] or [REW] key, move the pick-up to about the center of the signal surface (tune TNO 6). (TYPE 3: TNO 7)
6. Press the [MODE] key to open tracking.
7. While monitoring the TEY filter output by AC milli- voltmeter, turn the grating adjustment hole slowly. The AC voltage increases and decreases while turning the screw. Search for the minimum voltage level. (This corresponds to the position where the grating is on a track, and is referred to as the null point.)
8. Then while monitoring TEY by oscilloscope, turn the driver slowly clockwise from the null point (as seen from under the pick-up) until the first waveform peak amplitude is reached. (See Fig. 67-72)

9. With the E low-pass filter output connected to the X axis of the oscilloscope, and the F low-pass filter output connected to the Y axis, apply an input in AC mode and observe the Lissajous figure.
10. Using the driver, adjust the Lissajous figure to a single line (or as close as possible).
11. Switch DD converter OFF and remove the filters.

B.P.F.

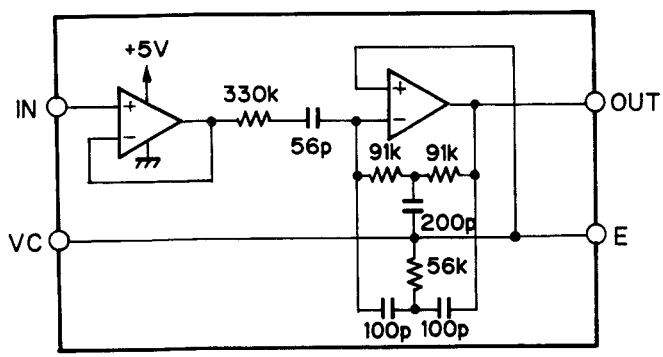


Fig. 66

TEY waveform 10ms/div, 500mV/div

Null Point

Lissajous figure (AC input)
Horizontal axis E 20mV/div
Vertical axis F 20mV/div

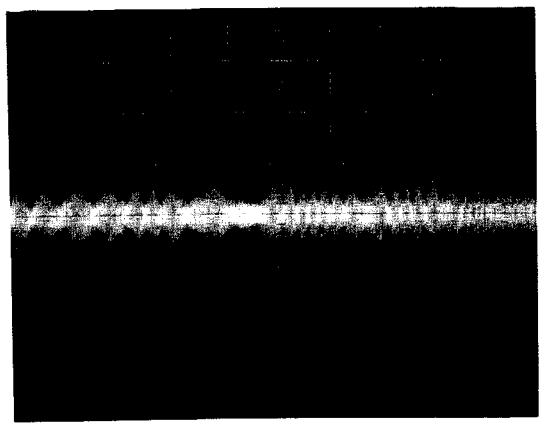


Fig. 67

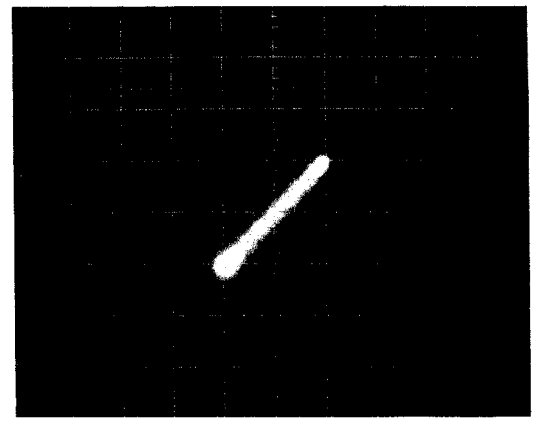


Fig. 68

"Rough" adjustment

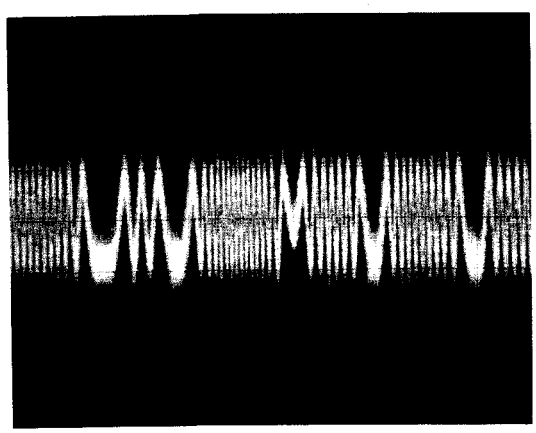


Fig. 69

Fig. 70

Final adjustment

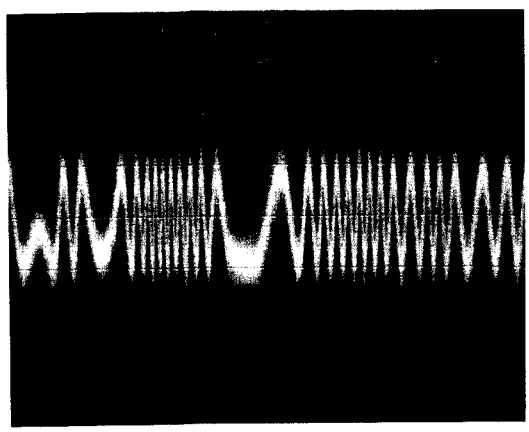


Fig. 71

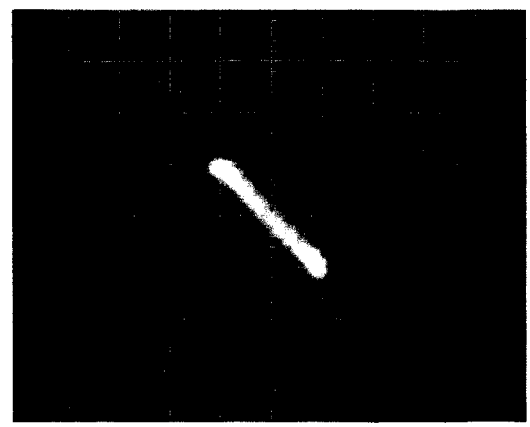


Fig. 72

5.9 Focus Bias Adjustment

● Purpose: To adjust the focus servo bias to an optimum value

● Maladjustment symptoms: Focus closing difficulty, poor playability

● Measuring equipment/ jigs	• Oscilloscope
● Measuring point	• RFO
● Test disc and setting	• SONY TYPE 4 (or TYPE 3) • Normal mode
● Adjustment position	• VR351-1 (FEB)

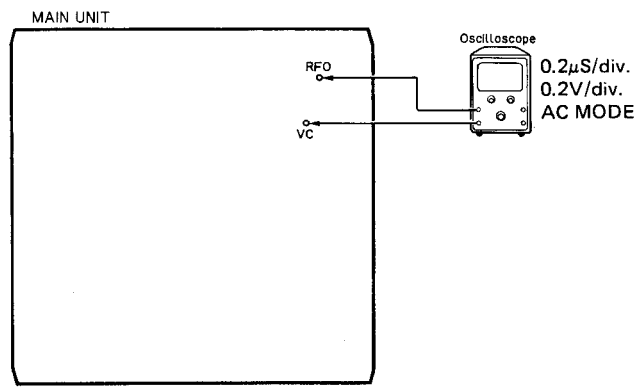
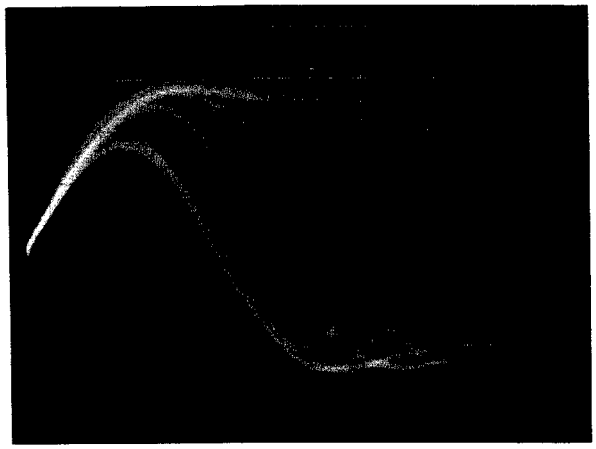


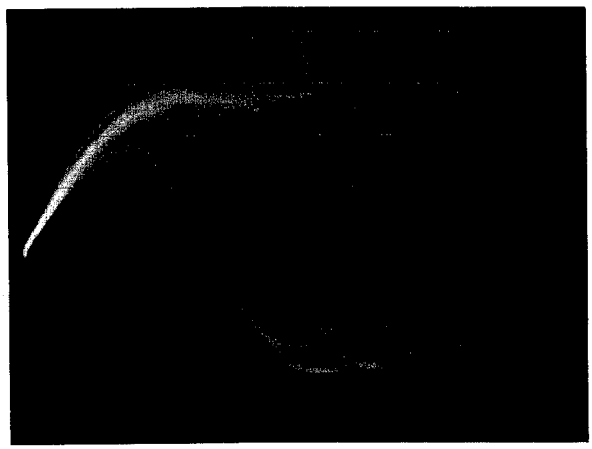
Fig. 73

Adjustment Procedure

1. Play tune TNO 12 in normal mode. (TYPE 3: TNO 14)
2. Observe RFO in respect to VC in the oscilloscope, and adjust VR351-1 (FEB) to obtain maximum RF and optimum eye pattern. (See Fig. 74 and 75)



OK Fig. 74



0.2μs/div.
0.2V/div.
AC Mode

Before adjustment Fig. 75

5.10 Focus Servo Loop Gain Adjustment

● Purpose: To adjust the focus servo loop gain to an optimum value

● Maladjustment symptoms: Poor playability, reduced resistance to vibration, focus closure fails readily

● Measuring equipment/ jigs	• Oscillator, gain adjustment filter, dual meter milli-voltmeter (Same as for CDX-2)
● Measuring point	• FEX, FEY
● Test disc and setting	• SONY TYPE 4 (or TYPE 3) • Normal mode
● Adjustment position	• VR601-3 (FG)

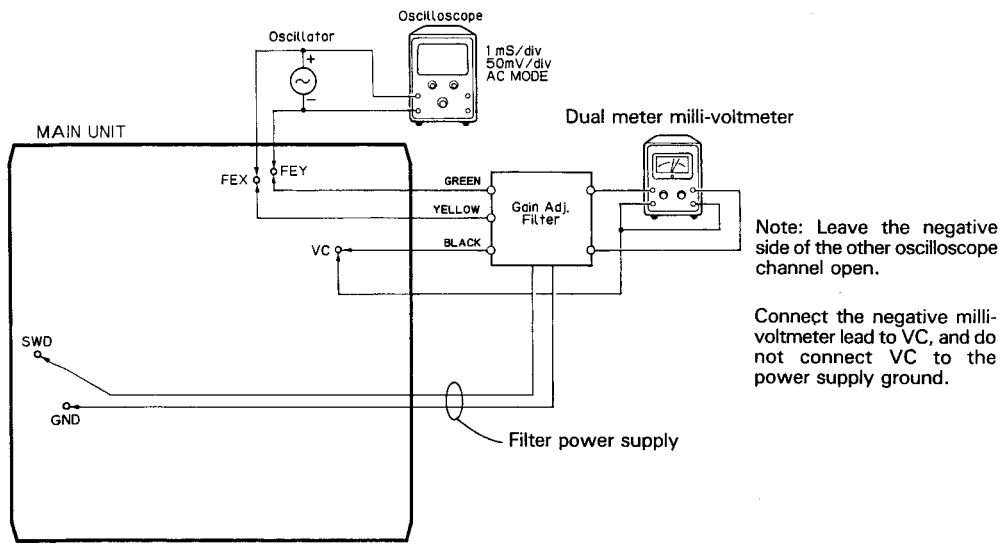


Fig. 76

Adjustment Procedure

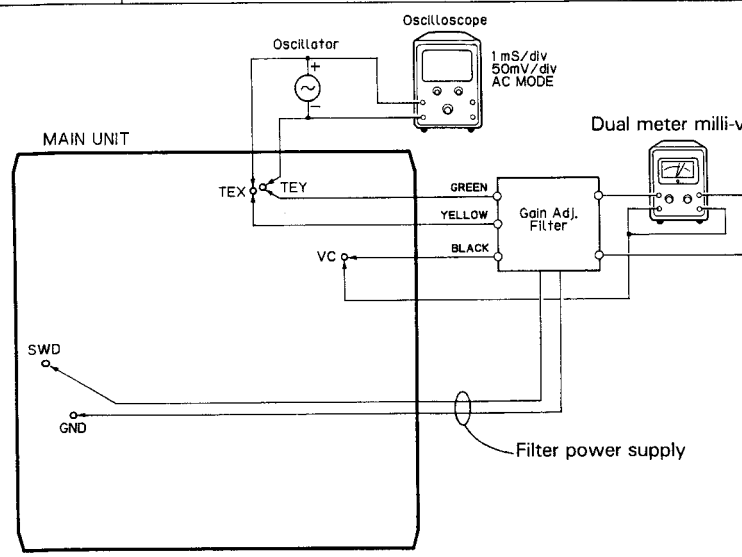
1. After checking that the power is OFF, connect the gain adjustment filter and measuring equipment as shown in the above diagram.
2. Play tune TNO 12 in normal mode. (TYPE 3: TNO 14)
3. Set the oscillator to 1kHz, and observe the FEX/FEY output in the oscilloscope. Adjust the oscillator output to obtain a FEX/FEY output of 100mVp-p.
4. Adjust VR601-3 (FG) to obtain a milli-voltmeter difference of 0 ±0.5dB.

5.11 Tracking Servo Loop Gain Adjustment

● Purpose: To adjust the tracking servo loop gain to an optimum value

● Maladjustment symptoms: Poor playability, reduced resistance to vibration

● Measuring equipment/ jigs	• Oscillator, gain adjustment filter, dual meter milli-voltmeter
● Measuring point	• TEX, TEY
● Test disc and setting	• SONY TYPE 4 (or TYPE 3) • Normal mode
● Adjustment position	• VR601-2 (TG)



Note: Leave the negative side of the other oscilloscope channel open.

Connect the negative milli-voltmeter lead to VC, and do not connect VC to the power supply ground.

Fig. 77

Adjustment Procedure

1. After checking that the power is OFF, connect the gain adjustment filter and measuring equipment as shown in the above diagram.
2. Play tune TNO 12 in normal mode. (TYPE 3: TNO 14)
3. Set the oscillator to 1.4kHz, and observe the TEX/TEY output in the oscilloscope. Adjust the oscillator output to obtain a TEX/TEY output of 100mVp-p.
4. Adjust VR601-2 (TG) to obtain a milli-voltmeter difference of 0 ±0.5dB.

5.12 TE Offset Adjustment - II

● Purpose: To adjust the electrical offset of the tracking servo to zero.

● Maladjustment symptoms: Search times too long, carriage run-away

● Measuring equipment/ jigs	• DC voltmeter
● Measuring point	• TAO low-pass filter output
● Test disc and setting	• Empty magazine • Test mode
● Adjustment position	• VR351-2

Adjustment Procedure

Same as for TE offset adjustment - I, but with the DC voltage of the TAO LPF output adjusted to 0 ± 50mV.
The purpose of this additional adjustment is to correct any deviations generated when carrying out the tracking balance and tracking servo loop gain adjustments after completing TE offset adjustment - I.

5.13 Tracking Balance Adjustment - II

● Purpose: To adjust the tracking servo offset to zero.

● Maladjustment symptoms: Search times too long, poor playability, carriage run-away

● Measuring equipment/ jigs	• Oscilloscope
● Measuring point	• TEY low-pass filter output
● Test disc and setting	• SONY TYPE 4 (or TYPE 3) • Test mode
● Adjustment position	• VR601-1

Adjustment Procedure

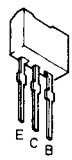
Steps 1 thru 5 same as tracking balance adjustment-I.

6. Check that the level difference between the positive and negative amplitudes of the TEY signal is within 5% (See Fig. 52-54). If greater than 5%, adjust with VR601-1.
7. If further adjustment was necessary in step 6, repeat TE offset adjustment -II.

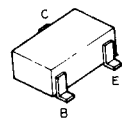
• ICs and Transistors

DTA124ES
DTC124ES

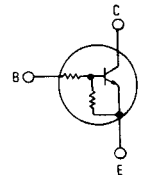
DTA124EL
DTC124EL



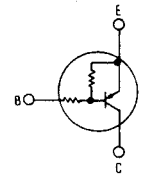
UN2211
UN2111



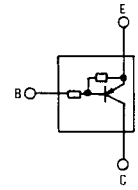
DTC124ES
DTC124EL



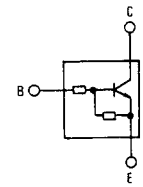
DTA124ES
DTA124EL



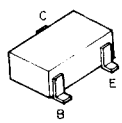
UN2111



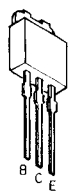
UN2211



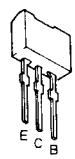
2SD1048



2SC3474

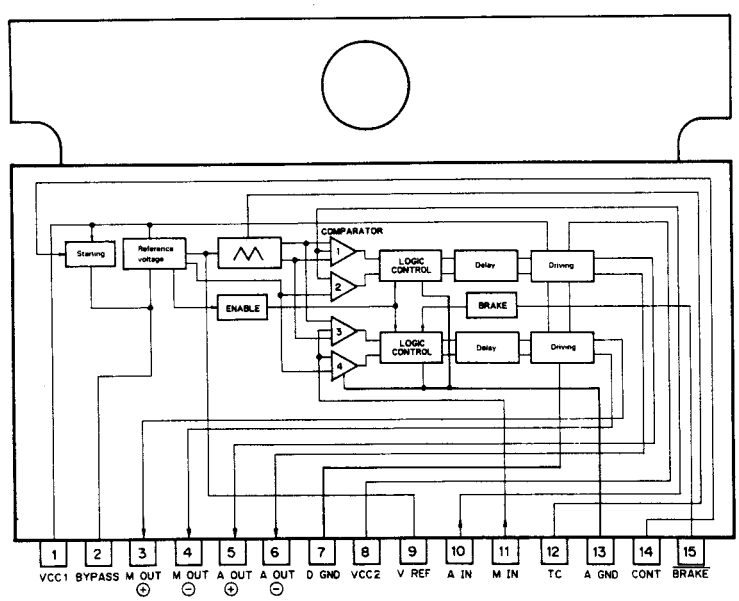


2SD1859
2SB1243



Main Unit

IC651, 652: PA3021B

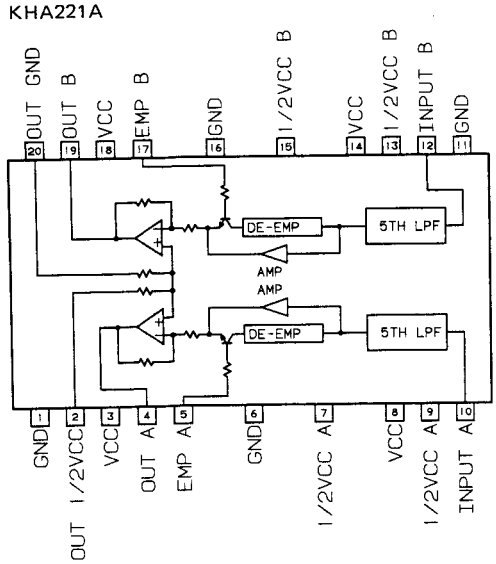


PA3021B Terminal Functions

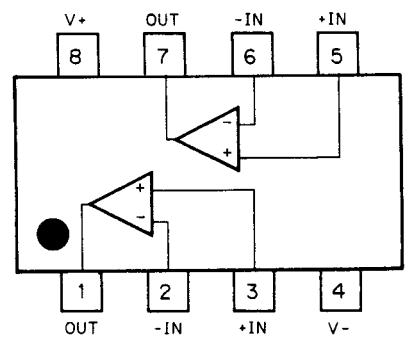
PWM driver

Pin No.	Pin name	I/O	Function and operation
1	VCC1		ACC power supply
2	BYPASS		IC reference voltage ripple filter condensor connection terminal
3	MOUT+	Output	Motor driver positive output terminal
4	MOUT–	Output	Motor driver negative output terminal
5	AOUT+	Output	Actuator driver positive output terminal
6	AOUT–	Output	Actuator driver negative output terminal
7	DGND		Power step GND terminal
8	VCC2		+5V power supply
9	Vref	Output	IC stabilizing supply output terminal
10	AIN	Input	Actuator system analog signal input terminal
11	MIN	Input	Motor system analog signal input terminal
12	TC		Chopping waveform condensor connection terminal
13	AGND		Small signal system GND terminal
14	CONT	Input	Circuit operation status, standby status selection terminal. Active "H".
15	BRAKE	Input	Motor system operation, non-operation (STOP) selection terminal. Active "L".

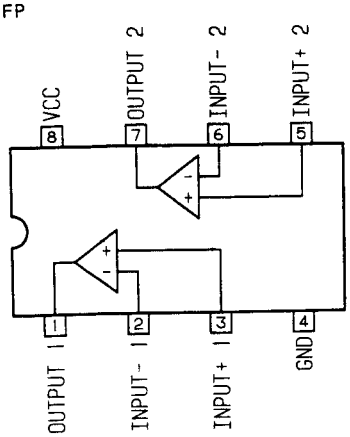
IC704: KHA221A



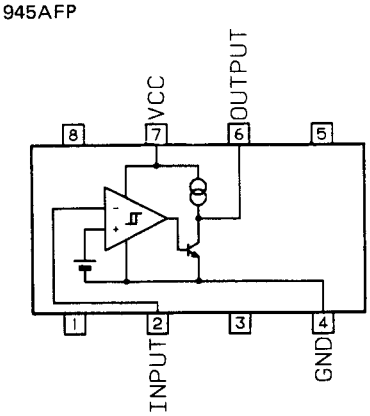
IC654, 655, 657, 658: M5218FP
IC653: μPC358G



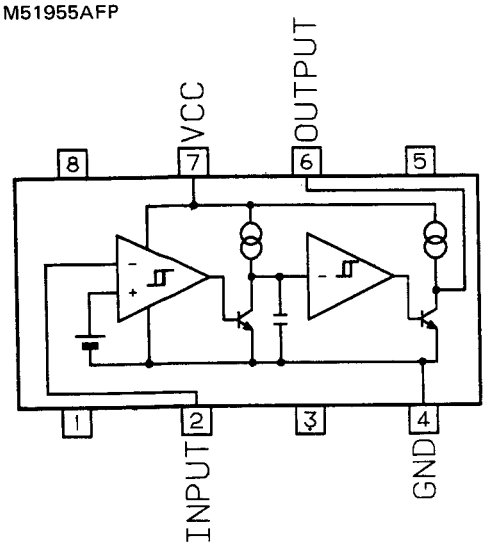
IC656: M5233FP



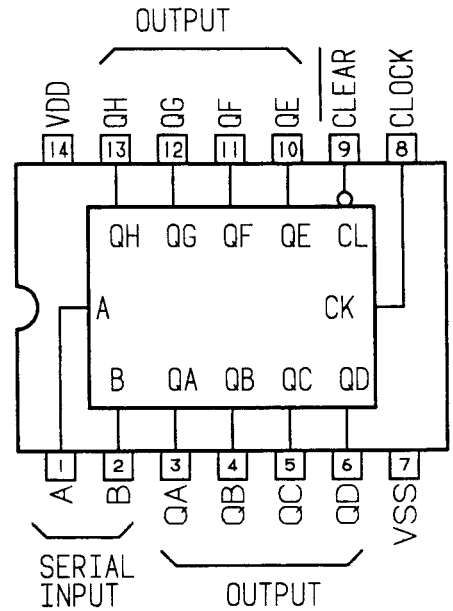
IC752: M51945AFP



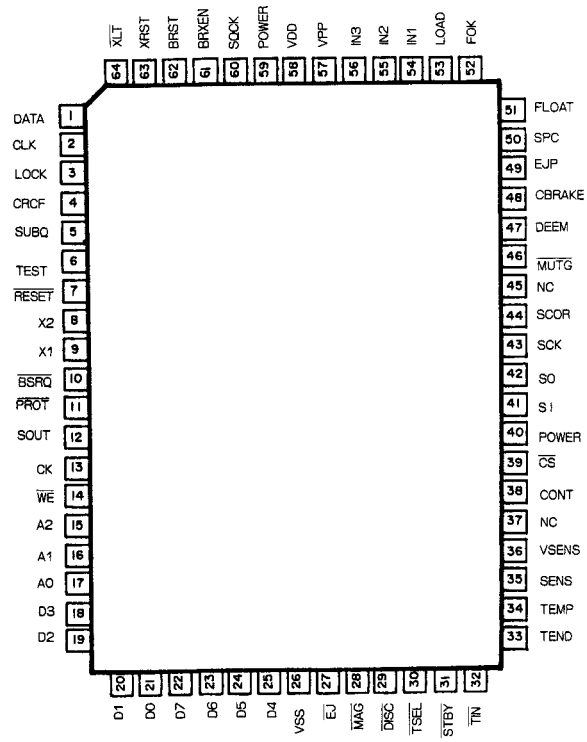
IC753: M51955AFP



IC754: TC40H164F



*IC751: PD4121



*IC's marked by * are MOS type.*
Be careful in handling them because they are very liable to be damaged by electrostatic induction.

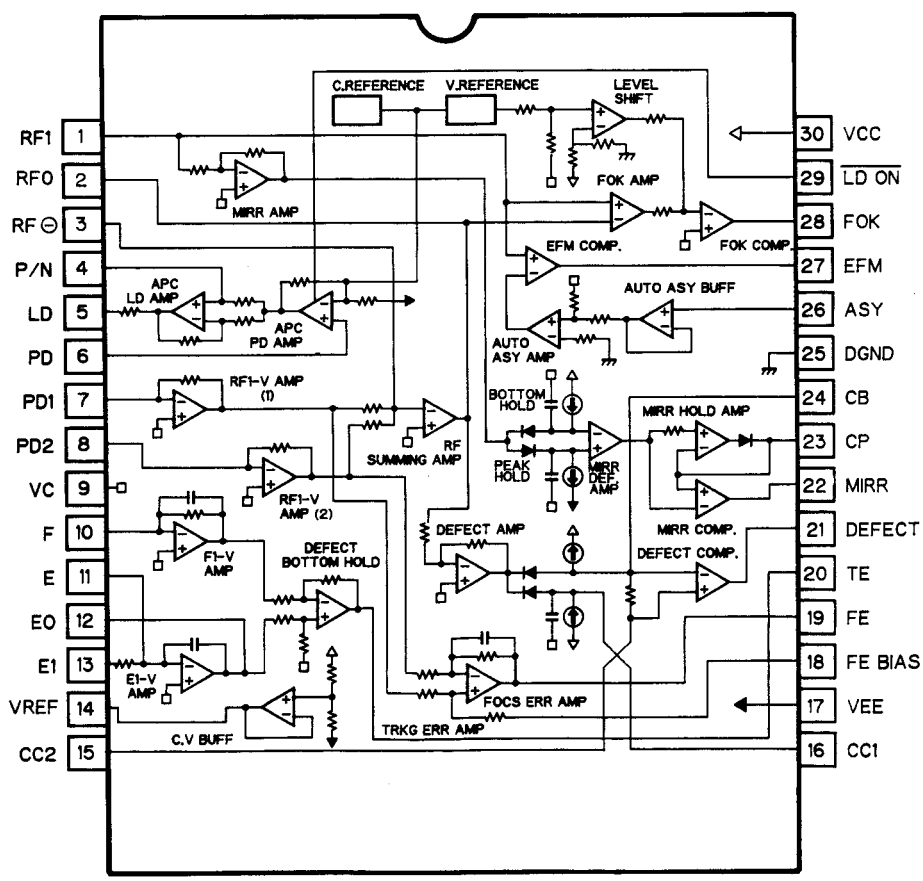
● Pin Functions (PD4121)

Pin No.	Pin Name	I/O	Output Format	Function and Operation
1	DATA	Output	C	Serial data output
2	CLK	Output	C	Serial data clock
3	LOCK	Input		Spindle lock monitor "H" = Lock
4	CRCF	Input		CRC check result input "H" = CRC OK
5	SUBQ	Input		Sub-code data input
6	TEST	Input		Chip check mode/normal mode switching - "L" = Normal
7	$\overline{\text{RESET}}$			Reset pin
8,9	X2, X1			Oscillator circuit
10	$\overline{\text{BSRQ}}$	Output	C	Service request line
11	$\overline{\text{PROT}}$	Output	C	RAM standby control - "L" = Standby
12	SOUT	Output	C	Address data
13	CK	Output	C	Address data shift clock
14	$\overline{\text{WE}}$	Output	C	RAM writing
15-17	A2-A0	Output	C	Address line (RAM)
18-21	D3-D0	Input/Output	C	Data line (RAM)
22-25	D7-D4	Input/Output	C	Data line (RAM)
26	VSS			Ground
27	$\overline{\text{EJ}}$	Input		Magazine EJECT key "L" = Key depressed
28	$\overline{\text{MAG}}$	Input		Magazine lock switch "L" = Magazine detect
29	$\overline{\text{DISC}}$	Input		Disc detector photosensor "L" = Disc loaded
30	$\overline{\text{TSEL}}$	Input		Tray position detector photosensor
31	$\overline{\text{STBY}}$	Input		Elevator standby position detector switch - "L" = ON
32	$\overline{\text{TIN}}$	Input		Magazine tray housing switch - "L" = Tray housed
33	TEND	Input		Disc clamped/Tray ejected
34	TEMP	Input		High temperature detector
35	$\overline{\text{SENS}}$	Input		CD LSI internal status monitor input
36	VSENS	Input		Back-up sensor - "H" = Back-up ON
37	NC	Output		
38	CONT	Output	C	PWM driver ON/OFF - "H" = ON
39	$\overline{\text{CS}}$	Output	C	RAM chip select - "L" = RAM ACTIVE
40	POWER	Output	C	DD converter ON/OFF - "H" = ON
41	SI	Input		Data line
42	SO	Output	C	Data line
43	SCK	Input/Output	C	Synchronizing shift clock
44	SCOR	Input		Sub-code synchronization input - T = 13.3msec during playback
45	NC	Output		
46	$\overline{\text{MUTG}}$	Output	NM	Muting output - "L" = Mute ON
47	DEEM	Output	NM	Emphasis selector output - "H" = Emphasis ON
48	$\overline{\text{CBRAKE}}$	Output	NM	PWM driver brake control - "L" = Brake ON
49	EJP	Input		Eject position switch - "L" = ON
50	SPC	Input		Spindle motor rpm indicator - "L" = Low speed
51	FLOAT	Input		Mechanical float switch - "L" = Mechanism fixed
52	FOK	Input		Indication that focus is closed and RF input is active "H" = RF active, "L" = No RF
53	LOAD	Output	NM	Loading power supply ON/OFF
54	IN1	Output	NM	Motor driver control pin

Pin No.	Pin Name	I/O	Output Format	Function and Operation
55	IN2	Output	NM	Motor reverse
56	IN3	Output	NM	Motor forward
57	VPP			Write power supply
58	VDD			+5V
59	POWER	Output	C	Power supply control
60	SQCK	Output	C	Sub-code clock
61	BRXEN	Input/Output	C	Line $\overline{\text{BUSY}}$ signal line
62	BRST	Input		Reset input
63	XRST	Output	C	CD LSI reset pin
64	$\overline{\text{XLT}}$	Output	C	Serial data latch output

Output format	Meaning
C	CMOS output
NM	Neutral resistivity N channel open drain

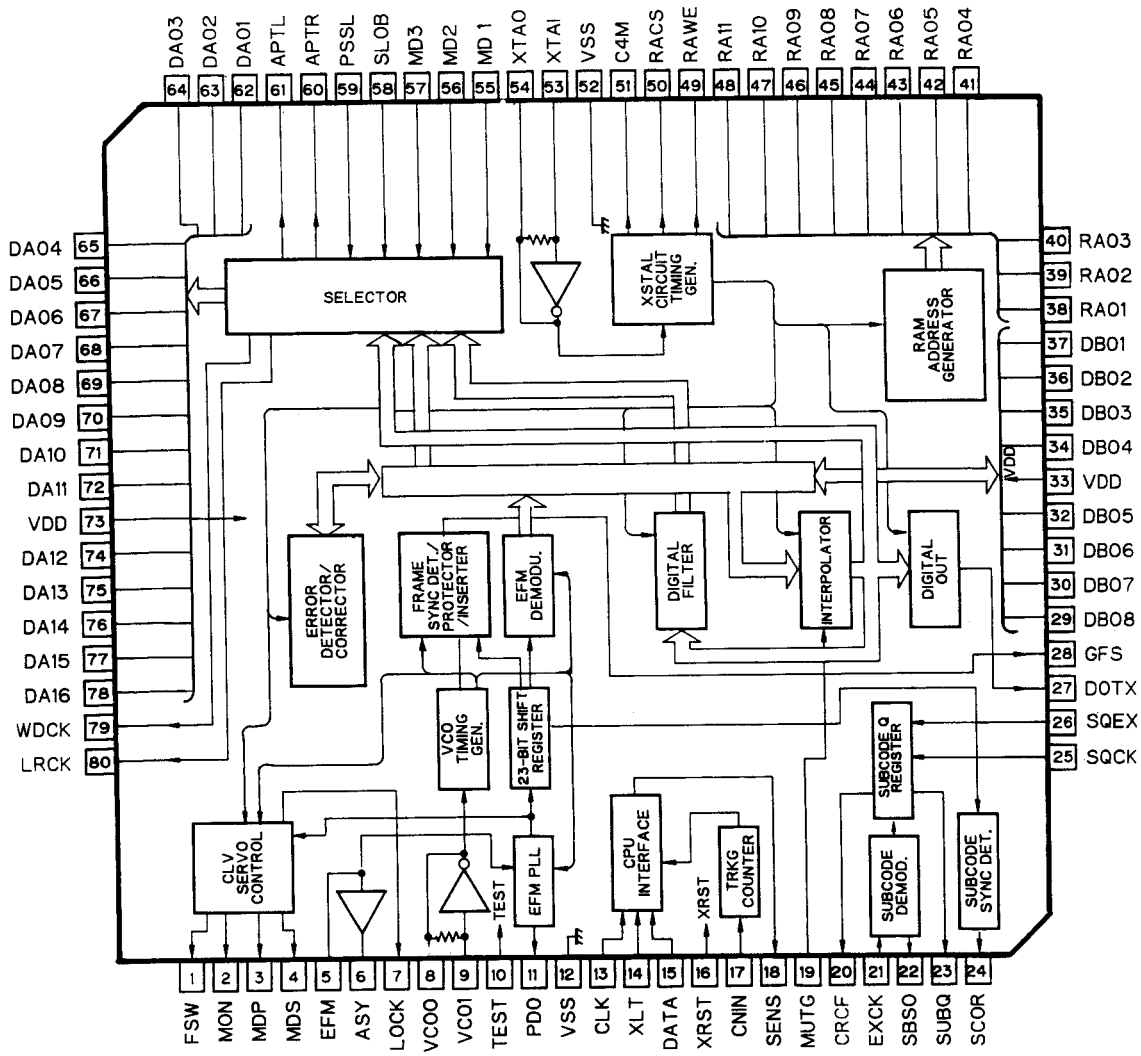
*IC351: CXA1081M



● Pin Functions (CXA1081M)

Pin No.	Pin Name	I/O	Function and Operation
1	RFI	Input	Input of capacitance-coupled RF summing amplifier output
2	RFO	Output	RF summing amplifier output pin - eye pattern check point
3	RF−	Input	RF summing amplifier feedback input pin
4	P/N	Input	Laser diode P-sub/N-sub selector pin
5	LD	Output	APC LD amplifier output pin
6	PD	Input	APC PD amplifier input pin
7	PD1	Input	RF I-V amplifier (1) inverter input pin - connected to photodiode A + C pin for current input
8	PD2	Input	RF I-V amplifier (2) inverter input pin - connected to photodiode B + D pin for current input
9	VC		Connected to VR
10	F	Input	I-V amplifier inverter input pin - connected to photodiode for current input
11	E	Input	I-V amplifier inverter input pin - connected to photodiode for current input
12	EO	Output	E I-V amplifier output pin
13	EI	Input	E I-V amplifier feedback input pin for E I-V amplifier gain adjustment
14	VR	Output	$(V_{CC} + V_{EE})/2$ DC voltage output pin
15	CC2	Input	Input of capacitance-coupled DEFECT bottom hold output
16	CC1	Output	DEFECT bottom hold output pin
17	VEE		Ground connection
18	FE BIAS	Input	Focus error amplifier non-inverting bias pin Used in focus error amplifier CMR adjustment
19	FE	Output	Focus error amplifier output pin
20	TE	Output	Tracking error amplifier output pin
21	DEFECT	Output	DEFECT comparator output pin
22	MIRR	Output	MIRR comparator output pin
23	CP	Input	MIRR hold capacitor connector pin - MIRR comparator non-inverting input pin
24	CB	Input	DEFECT bottom hold capacitor connector pin
25	DGND		Ground connection
26	ASY	Input	Auto asymmetry control input pin
27	EFM	Output	EFM comparator output pin
28	FOK	Output	Focus OK comparator output pin
29	$\overline{\text{LDON}}$	Input	Laser diode ON/OFF switching
30	VCC		Positive power supply pin

*IC701: CXD1135Q



● Pin Functions (CXD1135Q)

Pin No.	Pin Name	I/O	Function and Operation
1	FSW	Output	Spindle motor output filter time constant selector output
2	MON	Output	Spindle motor ON/OFF control output
3	MDP	Output	Spindle motor drive output - "rough" control in CLV-S mode, and phase control in CLV-P mode
4	MDS	Output	Spindle motor drive output - speed control in CLV-P mode
5	EFM	Input	EFM signal input from RF amplifier
6	ASY	Output	EFM signal slice level control output
7	LOCK	Output	Sampling of GFS signal by WFCK/16 - "H" output if "H", "L" output if "L" detected eight times in succession
8	VCOO	Output	VCO output - f = 8.6436MHz when EFM signal is locked
9	VCOI	Input	VCO input
10	TEST	Input	(0V)
11	PDO	Ouptut	EFM signal and VCO/2 phase comparison output
12	V_{SS}	—	Ground (0V)
13	CLK	Input	Serial data transfer clock input from CPU - data latched by clock leading edge
14	XLT	Input	Latch input from CPU - 8-bit shift register data (serial data from CPU) is latched in each register.
15	DATA	Input	Serial data input from CPU
16	XRST	Input	System reset signal input - reset when "L"
17	CNIN	Input	Tracking pulse input
18	SENS	Output	Output of internal status according to address
19	MUTG	Input	Muting input - when ATTM of internal register A is "L", MUTG "L" denotes normal status, and "H" muted status
20	CRCF	Output	Sub-code Q CRC check result output
21	EXCK	Input	Clock input for sub-code serial output
22	SBSO	Output	Sub-code serial output
23	SUBQ	Output	Sub-code Q output
24	SCOR	Output	Sub-code synchronizing S0+S1 output
25	SQCK	Input/Output	Sub-code Q read clock
26	SQEX	Input	SQCK selector input
27	DOTX	Output	Digital out output ($\overline{\text{WFCK}}$ output)
28	GFS	Output	Frame synchronizing lock status indicator output
29	DB08	Input/Output	External RAM data pin - DATA8 (MSB)
30	DB07	Input/Output	External RAM data pin - DATA7
31	DB06	Input/Output	External RAM data pin - DATA6
32	DB05	Input/Output	External RAM data pin - DATA5
33	V_{DD}	—	Power supply (+5V)
34	DB04	Input/Output	External RAM data pin - DATA4
35	DB03	Input/Output	External RAM data pin - DATA3

Pin No.	Pin Name	I/O	Function and Operation
36	DB02	Input/Output	External RAM data pin - DATA2
37	DB01	Input/Output	External RAM data pin - DATA1 (LSB)
38	RA01	Output	External RAM address output - ADDR01 (LSB)
39	RA02	Output	External RAM address output - ADDR02
40	RA03	Output	External RAM address output - ADDR03
41	RA04	Output	External RAM address output - ADDR04
42	RA05	Output	External RAM address output - ADDR05
43	RA06	Output	External RAM address output - ADDR06
44	RA07	Output	External RAM address output - ADDR07
45	RA08	Output	External RAM address output - ADDR08
46	RA09	Output	External RAM address output - ADDR09
47	RA10	Output	External RAM address output - ADDR010
48	RA11	Output	External RAM address output - ADDR011 (MSB)
49	RAWE	Output	External RAM write enable signal output (active "L")
50	RACS	Output	External RAM chip select signal output (active "L")
51	C4M	Output	X'tal frequency division output (f = 4.2336MHz)
52	V_{SS}	–	Ground (0V)
53	XTAI	Input	Crystal oscillator input (f = 8.4672MHz)
54	XTAO	Output	Crystal oscillator output (f = 8.4672MHz)
55	MD1	Input	Mode selector input 1
56	MD2	Input	Mode selector input 2
57	MD3	Input	Mode selector input 3
58	SLOB	Input	Audio data output code selector input - 2's complement output if "L", offset binary output if "H"
59	PSSL	Input	Audio data output mode selector input - serial output if "L", parallel output if "H"
60	APTR	Output	Aperture correction control output - "H" when right channel
61	APTL	Output	Aperture correction control output - "L" when left channel
62	DA01	Output	C1F1 output
63	DA02	Output	C1F2 output
64	DA03	Output	C2F1 output
65	DA04	Output	C2F2 output
66	DA05	Output	C2FL output
67	DA06	Output	C2PO output
68	DA07	Output	RFCK output
69	DA08	Output	WFCK output
70	DA09	Output	$\overline{\text{PLCK}}$ output
71	DA10	Output	UGFS output
72	DA11	Output	GTOP output

Pin No.	Pin Name	I/O	Function and Operation
73	V_{DD}	—	Power supply (+5V)
74	DA12	Output	RAOV output
75	DA13	Output	C4LR output
76	DA14	Output	$\overline{C21O}$ output
77	DA15	Output	C21O output
78	DA16	Output	DATA output
79	WDCK	Output	Strobe signal output (176.4kHz)
80	LRCK	Output	Strobe signal output (88.2kHz)

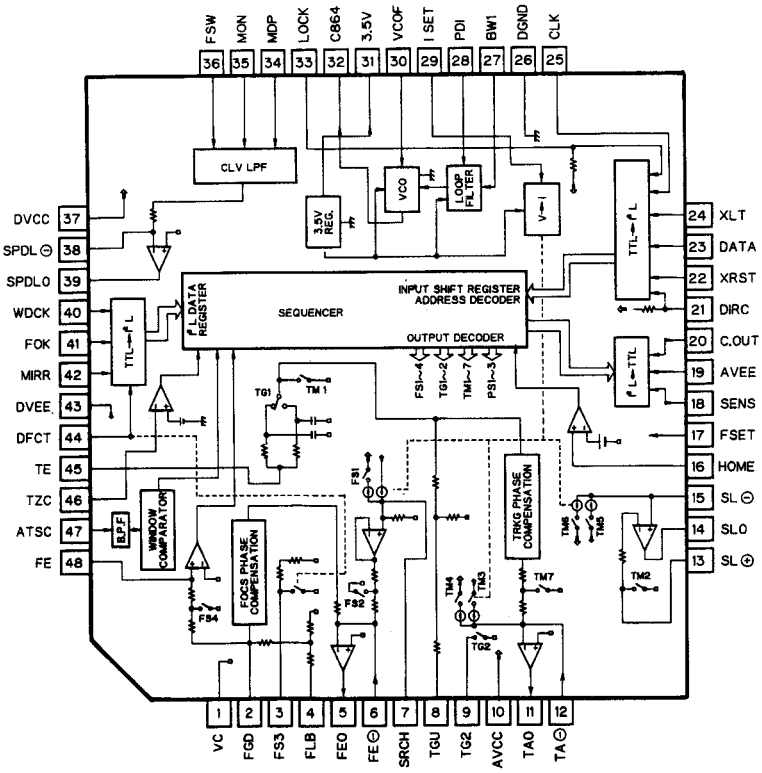
Note:

C1F1: ┐
C1F2: ┘ C1 decoding error correction status monitor output

C2F1: ┐
C2F2: ┘ C2 decoding error correction status monitor output

C2FL: Corrected status output - "H" if C2 system currently being corrected cannot be corrected
C2PO: C2 pointer indication output - synchronized with audio data output
RFCK: Read frame clock output - crystal oscillator 7.35kHz
WFCK: Write frame clock output - f = 7.35kHz when crystal oscillator is locked
$\overline{PLCK}$: VCO/2 output - f = 4.3218MHz when EFM signal is locked
UGFS: Unprotected frame synchronizing pattern output
GTOP: Frame synchronization protection status indicator output
RAOV: ±4 frame jitter absorption RAM overflow and underflow indicator output
C4LR: Strobe signal - 176.4kHz
$\overline{C21O}$: C21O inverting output
C21O: Bit clock output - 2.1168MHz
DATA: Audio signal serial data output

*IC601: CXA1082AQ

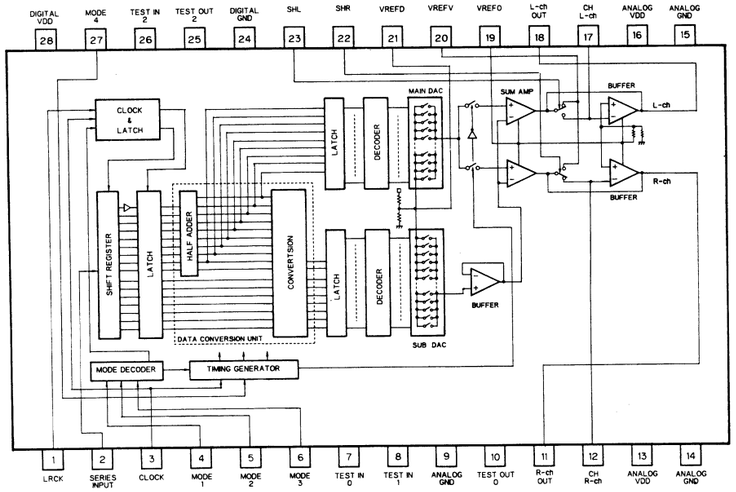


● Pin Functions (CXA1082AQ)

Pin No.	Pin Name	I/O	Function and Operation
1	VC		Servo reference voltage input pin
2	FGD		Connect to pin 3 to switch focus servo OFF when defect occurs
3	FS3		Internal DFCT switch closed when pin 44 is high
4	FLB		Focus servo low region boost external time constant pin
5	FEO	Output	Focus drive output - connect to low-end equalizer
6	FE−	Input	Focus amplifier inverter input pin
7	SRCH		Focus search waveform generation external time constant connector pin
8	TGU	Output	Tracking low-end equalizer connection output pin
9	TG2		Pin 7 discharge switch for starting focus search from lens center
10	AVCC		+5V connection
11	TAO	Output	Tracking drive output
12	TA−	Input	Tracking amplifier inverter input pin
13	SL+	Input	Sled amplifier non-inverting input pin
14	SLO	Output	Sled drive output
15	SL−	Input	Sled amplifier inverter input pin
16	HOME	Input	Sled home position detector switch input pin
17	FSET		Focus/tracking phase compensation peak and CLV low-pass filter f_O setting pin
18	SENS	Output	Output of FZC, AS, TZC, SSTOP, and $\overline{\text{BUSY}}$ depending on command from CPU
19	AVEE		AGND connection
20	COUT	Output	Track counter signal output
21	DIRC		Not used
22	XRST	Input	Reset input pin - reset when "L"
23	DATA	Input	Serial data input from CPU
24	XLT	Input	Latch input from CPU
25	CLK	Input	Serial data transfer clock input from CPU
26	DGND		DGND connection
27	BW1		Loop filter external time constant pin
28	PDI	Input	Input of CXD1135 phase comparator output PDO
29	ISET		Current which determines focus search, track jump, and sled kick height
30	VCOF		VCO free-running frequency more or less inversely
31	3.5V	Output	Proportional to resistance value between pins 30 and 31
32	C864	Output	8.64MHz VCO output pin
33	LOCK		Not used
34	MDP		Connect to MDP pin of CXD1135
35	MON		Connect to MON pin of CXD1135
36	FSW		CLV servo error signal low-pass filter external time constant pin
37	DVCC		+5V connection
38	SPDL−	Input	Spindle drive amplifier inverter input pin

Pin No.	Pin Name	I/O	Function and Operation
39	SPDLO	Output	Spindle drive output
40	WDCK	Input	Auto-sequence clock input 176.4kHz
41	FOK	Input	FOK signal input pin
42	MIRR	Input	Mirror signal input pin
43	DVEE		DGND connection
44	DFCT	Input	DEFECT signal input pin - defect countermeasure circuit activated when this input is high
45	TE	Input	Tracking error signal input pin
46	TZC	Input	Tracking zero-cross comparator input pin
47	ATSC	Input	Tracking lens offset detector window comparator input pin
48	FE	Input	Focus error signal input pin

*IC703: μPD6355G



● Pin Functions (μPD6355G)

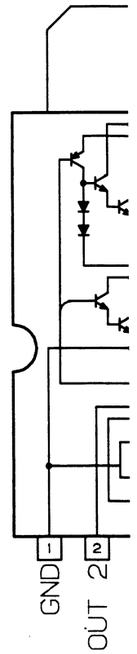
Pin No.	Pin Name	I/O	Function and Operation
1	LRCK	Input	Input data left/right discriminator signal input pin ''L'' = Left, ''H'' = Right
2	SI	Input	Serial data input pin
3	CLK	Input	Serial input data read clock input pin
4-6	M1-M3	Input	Input data mode selector pin
7,8	TI_0, TI_1	Input	Test pins
9	A·GND		Analog stage ground pin
10	TO0	Output	Test pin
11	ROUT	Output	Right channel analog signal output pin
12	CHR	Output	Right channel analog signal sample hold capacitor pin
13	A·VDD		Analog stage power supply pin

Pin No.	Pin Name	I/O	Function and Operation
14,15	A·GND		Analog stage ground pins
16	A·VDD		Analog stage power supply pin
17	CHL	Output	Left channel analog signal sample hold capacitor pin
18	LOUT	Output	Left channel analog signal output pin
19	VREFO		Operation amplifier reference connection
20	VREFV		Connection to AGND via capacitor
21	VREFD		Connection to resistance ladder
22	SHR	Input	Right channel analog output sample hold timing signal Active high
23	SHL	Input	Left channel analog output sample hold timing signal Active high
24	D·GND		Logic stage ground pin
25	TO2	Output	Test pin
26	TI2	Input	Test pin
27	M4	Input	Internal logic clock selection which determines whether input from CLK pin is to be divided or not ''H'': No division, ''L'': Divide by 2
28	D·VDD		Logic stage power supply pin

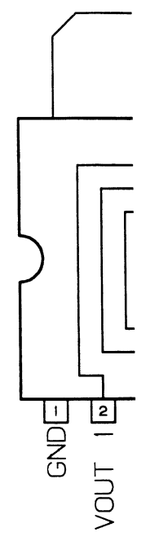
*IC702, 755: CXK5816M-15L

Driver P.C. Bo

IC801: BA6238



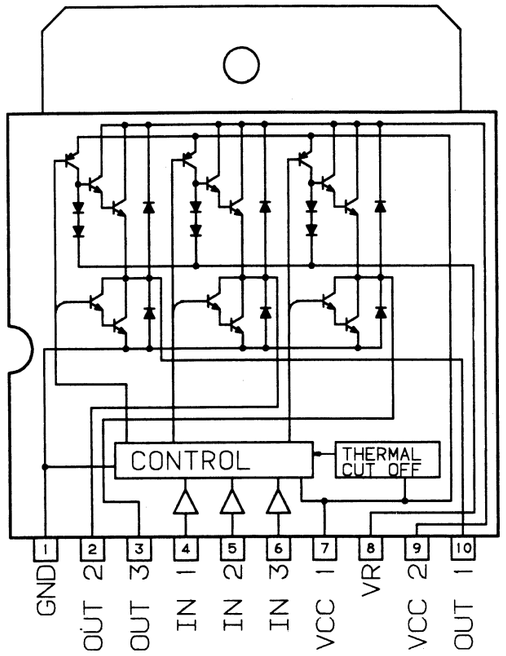
IC803: BA6209



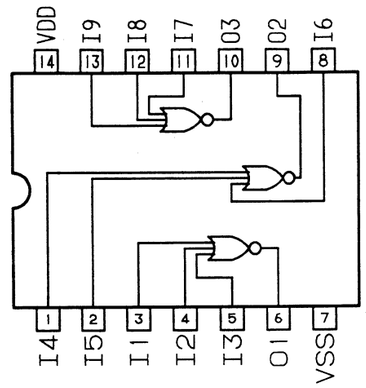
in is to be divided

Driver P.C. Board

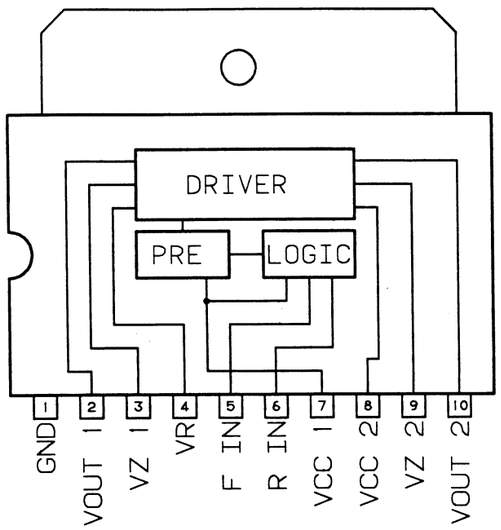
IC801: BA6238A



IC802: TC4025B



IC803: BA6209



● Truth Table (BA6209)

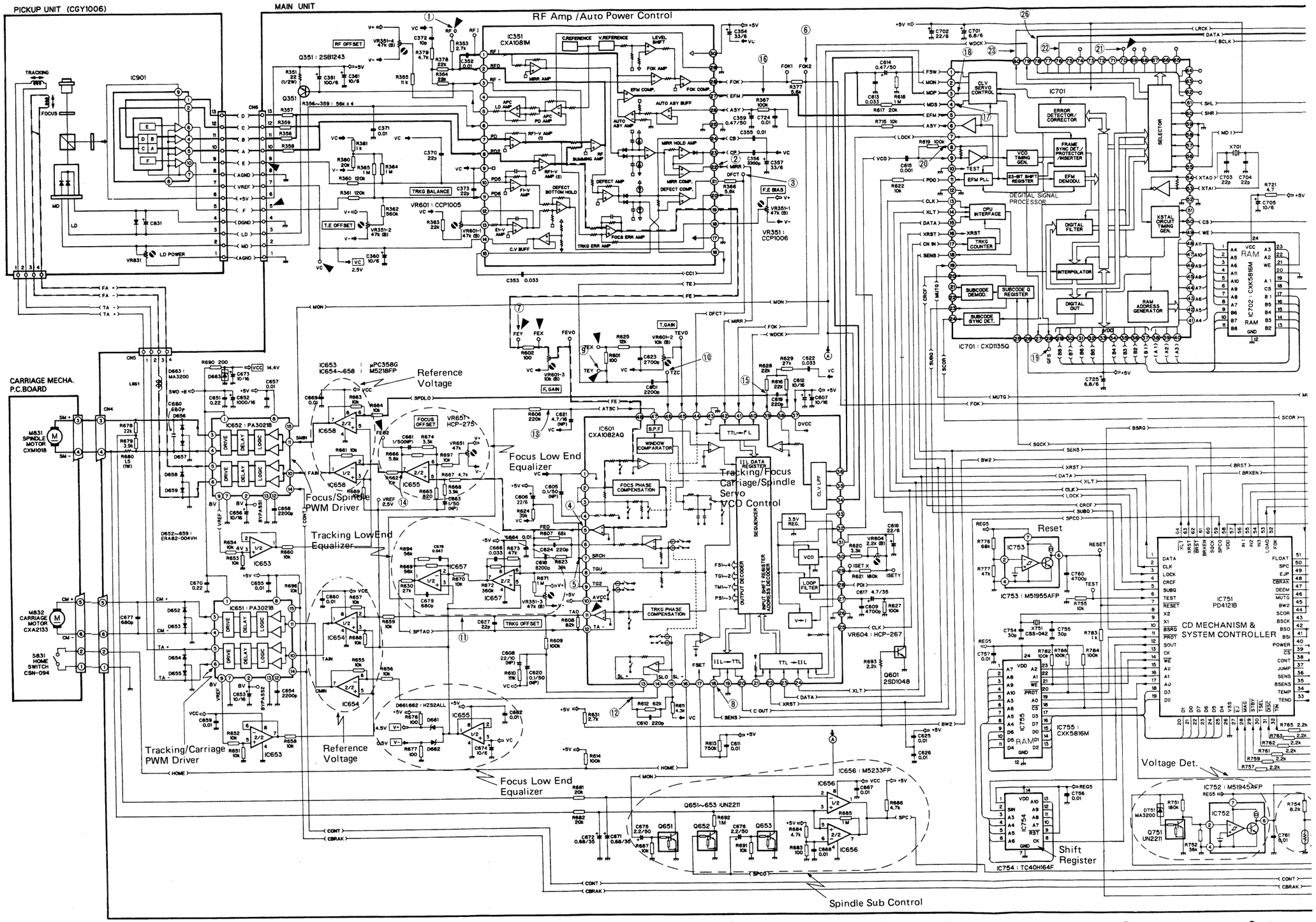
FIN (Pin 5)	RIN (pin 6)	VOUT1 (pin 2)	VOUT2 (pin 10)
H	H	L	L
L	H	L	H
H	L	H	L
L	L	L	L

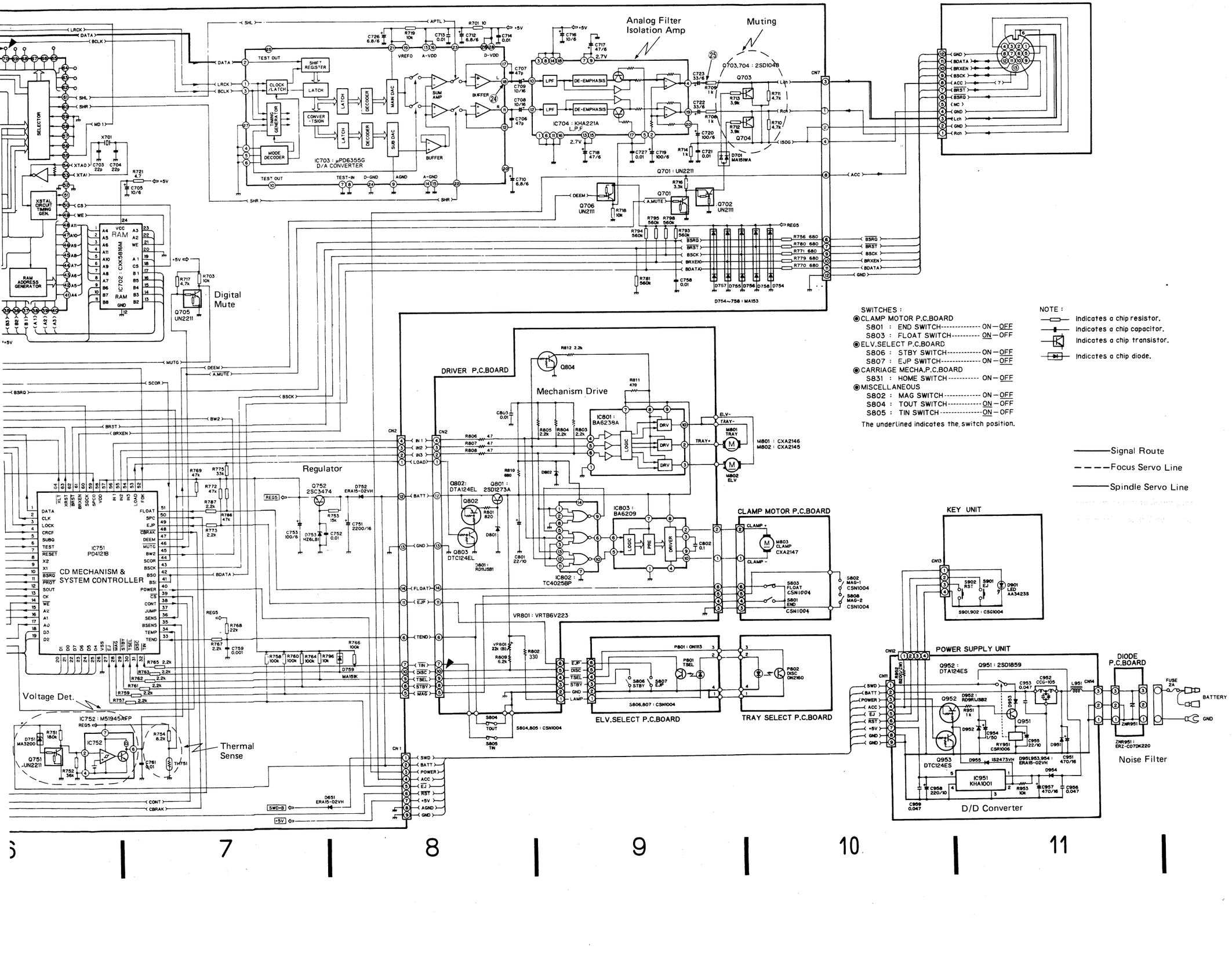
Note: Input level H more than 2.0V, and input level L less than 0.7V

● Circuit Diagram Symbols

Symbol	Function
A	1/4 division detector output used in detection of RF and focus signal
ACC	14.4V
AGND	Analog ground
ASY	Asymmetry
ATSC	Anti-shock (carriage motor control during playback)
B	1/4 division detector output used in detection of RF and focus signal
BATT	14.4V (Constant power supply)
BDATA	Bus data signal
BRST	Bus reset signal
BRXEN	Bus line busy signal
BSCK	Bus synchronizing shift clock
BSRQ	Bus service request line
BYPASS1	Bypass 1 (non-drive enabled by connecting to ground during PWM IC651 operation)
BYPASS2	Bypass 2 (non-drive enabled by connecting to ground during PWM IC652 operation)
C	1/4 division detector output used in detection of RF and focus signal
CBRAKE	PWM driver brake control signal (brake on when "L")
CLAMP+	Clamp motor drive signals
CLAMP–	
CM+	Carriage motor drive signal (PWM OUT)
CM–	
CONT	PWM driver ON/OFF signal (ON when "H")
D	1/4 division detector output used in detection of RF and focus signal
DEEM	Emphasis selector switch (emphasis ON when "H")
DFCT	DEFECT signal ("H" when defect)
DGND	Digital ground
DISC	Disc presence detector signal
E	Tracking signal start detector
EFM	8-14 modulation
EJ	Eject key
EJP	Magazine position detector signal (eject position when "L")
ELV+	Elevation motor drive signals
ELV–	
END	Carriage mechanism END position detector signal
F	Tracking signal end detector
FA+	Focus actuator drive signal (PWM OUT)
FA–	
FAIN	Focus drive PWM input signal
FEO	Focus signal output (IC601, CXA1082AQ pin no.5)
FEO2	Focus 2 (IC655 pin no.7)
FLOAT	Carriage mechanism play position detector signal
HOME	Home position detector signal (pick-up at home position when "L")
IN1	Motor control signal 1
IN2	Motor control signal 2
IN3	Motor control signal 3
ISETY	ISET resistance pin (IC601 pin no.31)
LAMP	Photo-interrupter drive signal
LD	Laser diode
LOAD	Magazine loading power supply ON/OFF signal
MON	Motor ON (spindle forward or reverse when "H")
MAG	Magazine detector signal
MD	Monitor diode
$\overline{\text{MUTG}}$	Mute signal (muting ON when "L")
POWER	Power supply control signal
REG5	+5V
SLO	Carriage output signal (IC601 pin no.14)
SM+	Spindle motor drive signals (PWM OUT)
SM–	
SPC	Spindle motor rpm detector signal (low speed when "L", IC656 pin nos.1 & 7)
SPCO	Spindle brake (spindle brake when "H", IC751 pin no. 59)
SPDLO	Spindle motor error signal (IC601 pin no.39)
SPTAO	Tracking side path signal output
SMIN	Spindle motor drive PWM input signal
STBY	Standby position detector signal
TA+	Tracking actuator drive signals (PWM OUT)
TA–	
TAIN	Tracking actuator drive PWM input signal
TEND	Mechanism clamped switching line
TGU	Tracking side path input
TIN	Tray position detector signal (tray housed when "L")
TIG	Switch ground
TOG	Switch ground
TOUT	Tray position detector signal (tray ejected when "H")
TRAY+	Tray motor drive signals
TRAY–	
TSEL	Magazine position detector signal
TZC	T.E zero-cross signal
VC	Signal reference voltage (2.5V)
VREF	Signal reference voltage buffer output (2.5V)

6. SCHEMATIC CIRCUIT DIAGRAM





SWITCHES :
- ◉CLAMP MOTOR P.C.BOARD
  - S801 : END SWITCH---------- ON—OFF
  - S803 : FLOAT SWITCH--------- ON—OFF
- ◉ELV.SELECT P.C.BOARD
  - S806 : STBY SWITCH---------- ON—OFF
  - S807 : EJP SWITCH---------- ON—OFF
- ◉CARRIAGE MECHA.P.C.BOARD
  - S831 : HOME SWITCH---------- ON—OFF
- ◉MISCELLANEOUS
  - S802 : MAG SWITCH---------- ON—OFF
  - S804 : TOUT SWITCH---------- ON—OFF
  - S805 : TIN SWITCH---------- ON—OFF

The underlined indicates the switch position.

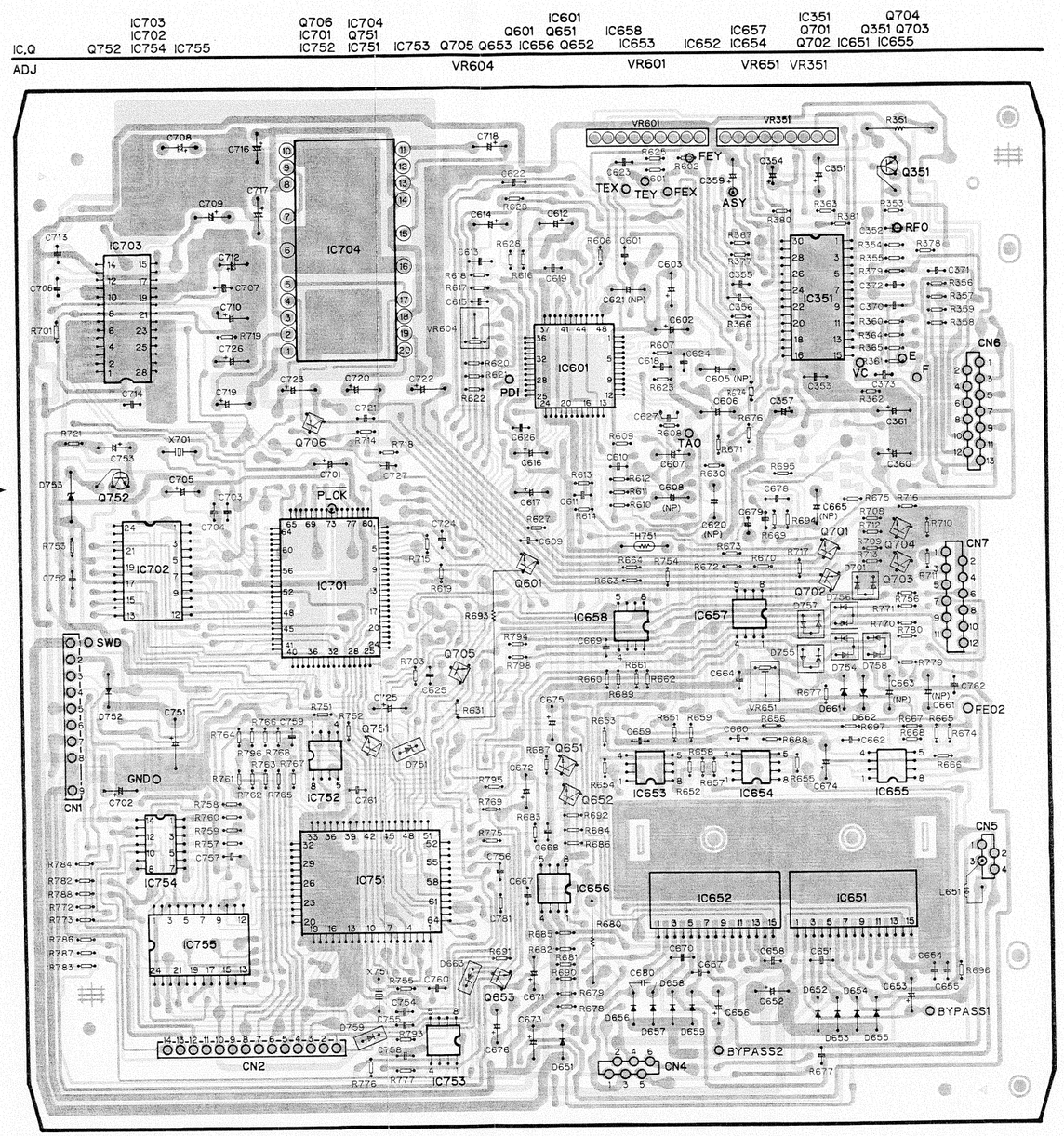
NOTE :
- Indicates a chip resistor.
- Indicates a chip capacitor.
- Indicates a chip transistor.
- Indicates a chip diode.

- ——— Signal Route
- - - - Focus Servo Line
- ——— Spindle Servo Line

Fig. 78

MAIN UNIT

CDX-M100/UC	CDX-M100/EW
Serial NO.	Serial NO.
00582 ~	00001 ~



68-71

7. CONNECTION DIAGRAM

MAIN UNIT

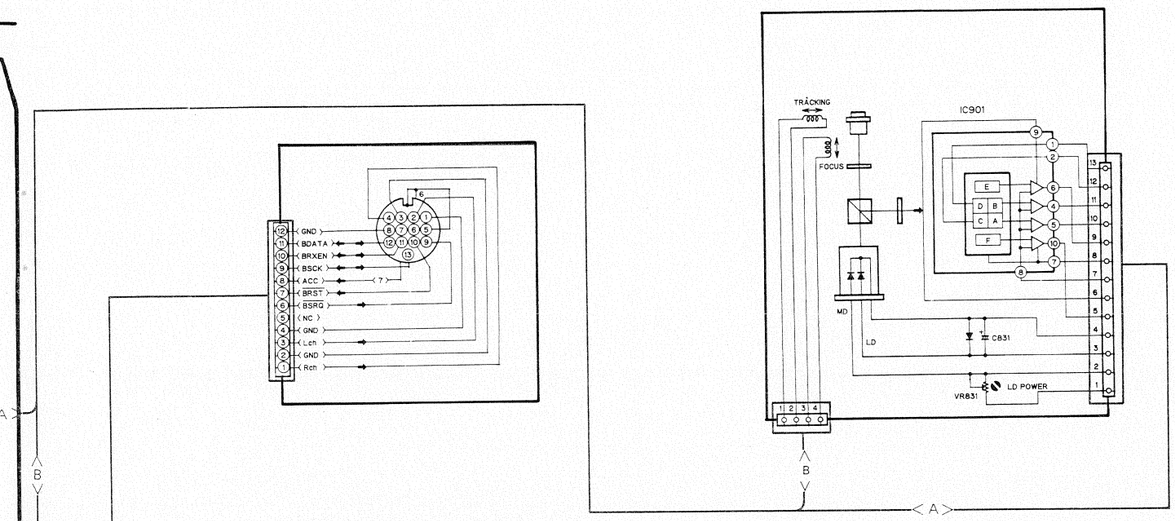
CDX-M100/UC
Serial NO.
~ 000581

POWER SUPPLY UNIT

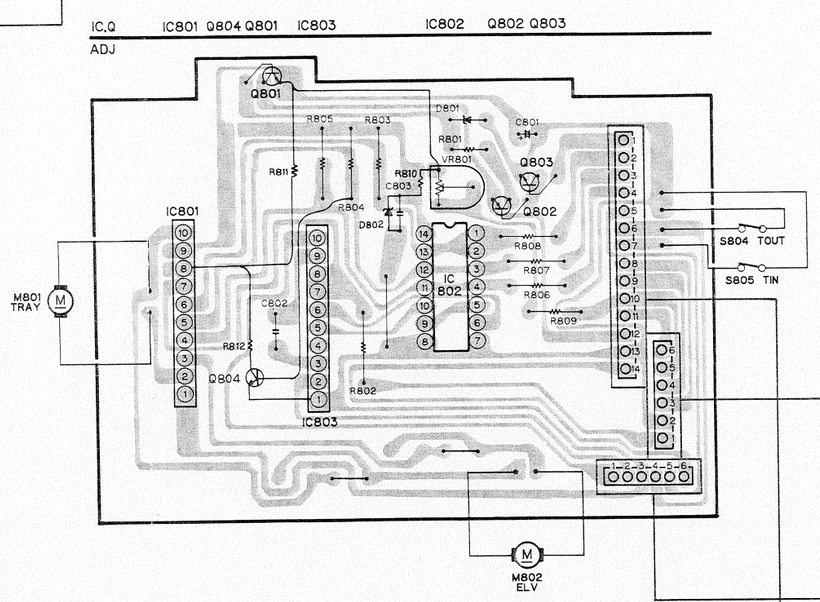
KEY UNIT

DIODE
P.C.BOARD

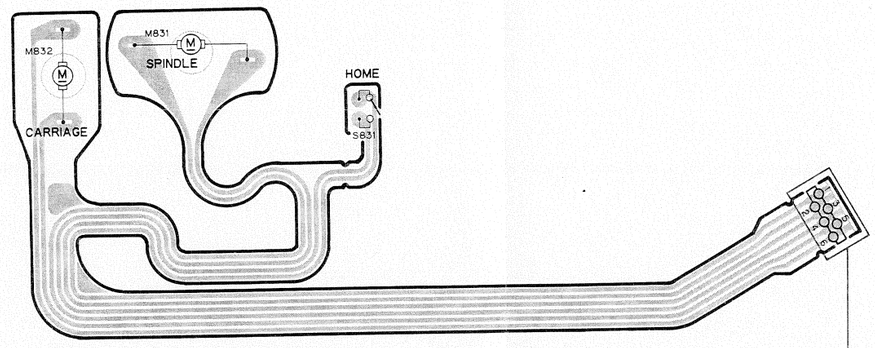
PICKUP UNIT (CGY1006)



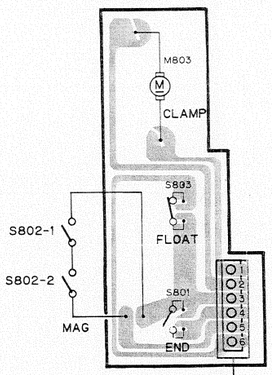
DRIVER P.C.BOARD



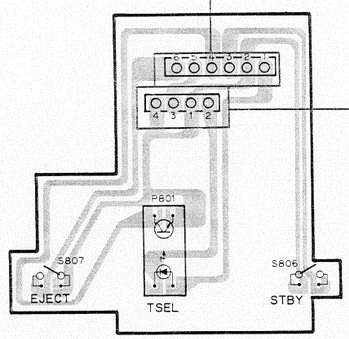
CARRIAGE MECHA P.C.BOARD



CLAMP MOTOR P.C.BOARD



ELV.SELECT P.C.BOARD



TRAY SELECT P.C.BOARD

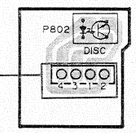
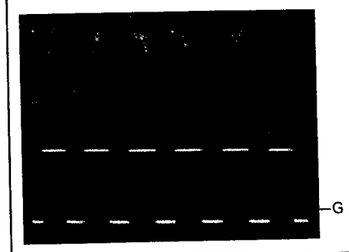


Fig. 79

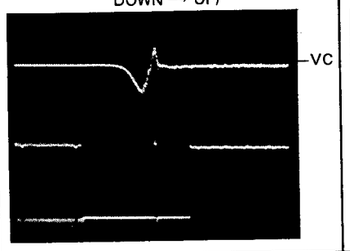
Note: 1. The encircled numbers denote measuring points in the circuit diagram.
2. Reference voltage
G: GND VC: Pin 9 of CXA1081M (2.5V)

• Wave Forms

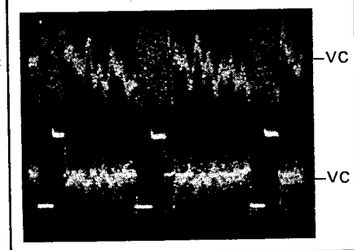
① CH1: RFO 0.4V/div. 0.4ms/div.
② CH2: MIRR 2V/div.
Test mode: Tracking open



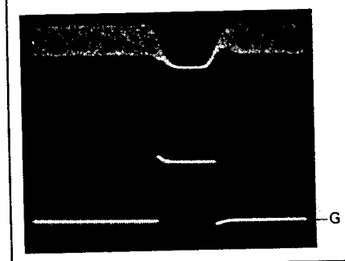
⑦ CH1: FEY 1V/div. 4ms/div.
⑧ CH2: SENS 2V/div.
Normal mode: Focus close (The lens moves DOWN → UP)



⑨ CH1: TEY 0.4V/div. 4ms/div.
⑪ CH2: TAO 0.4V/div.
Normal mode: Track search (80 track jump)

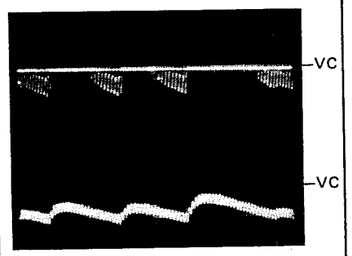


① CH1: RFO 1V/div. 0.4ms/div.
③ CH2: DEFECT 2V/div.
Normal mode: The defect part passes 800μm.

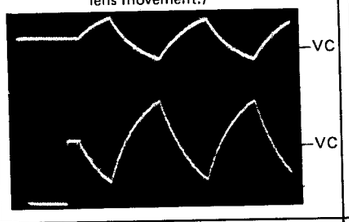


⑨ CH1: TEY 0.4V/div. 0.4ms/div.
⑩ CH2: TZC 0.4V/div.
Test mode: Tracking open

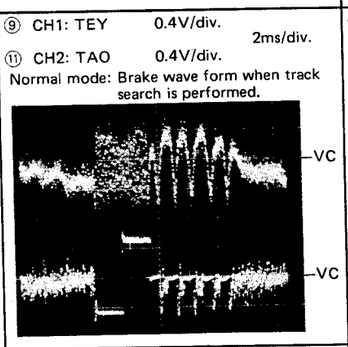
⑫ CH1: SLO 0.4V/div. 2S/div.
⑬ CH2: ATSC 0.02V/div.
Normal mode: PLAY



④ CH1: FEO 0.2V/div. 0.4S/div.
⑤ CH2: Pin 7 of CXA1082AQ 0.04V/div.
Test mode: Connect the FOK2 to GND. Focus search is performed. (CH2 is the same phase as the lens movement.)

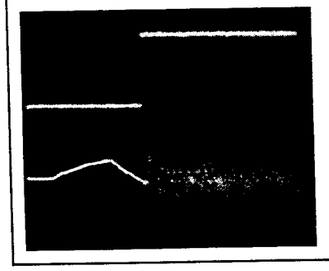


⑨ CH1: TEY 0.4V/div. 2ms/div.
⑪ CH2: TAO 0.4V/div.
Normal mode: Brake wave form when track search is performed.

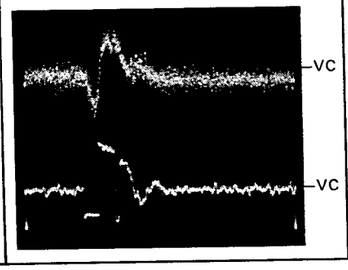


① RFO 0.5V/div. 200ns/div.
Normal mode: PLAY

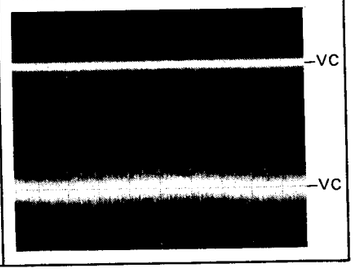
⑥ CH1: FOK2 2V/div. 0.2S/div.
④ CH2: FEO 0.2V/div.
Normal mode: Focus close



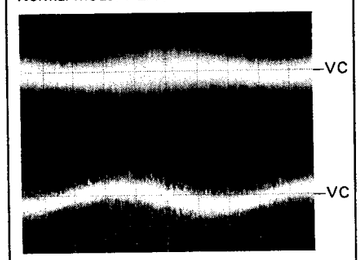
⑨ CH1: TEY 0.4V/div. 0.4ms/div.
⑪ CH2: TAO 0.4V/div.
Test mode: Single jump



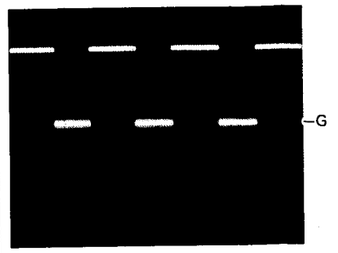
⑦ CH1: FEY 0.5V/div. 20ms/div.
⑭ CH2: FEO2 0.5V/div.
Normal mode: PLAY



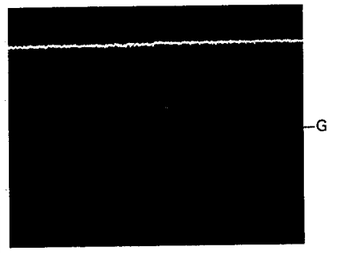
⑨ CH1: TEY 0.5V/div. 20ms/div.
⑪ CH2: TAO 0.5V/div.
Normal mode: PLAY



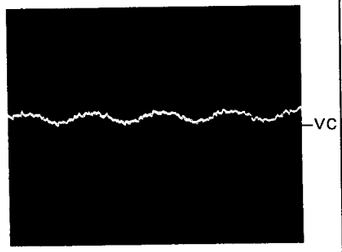
⑰ MDS 2V/div. 50μs/div.
PLAY



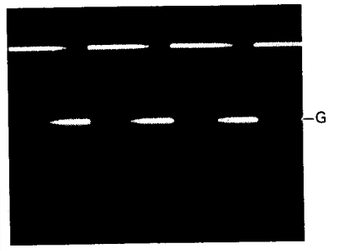
⑲ GFS 2V/div. 200μs/div.
PLAY



⑮ SPDLO 2V/div. 50ms/div.
PLAY



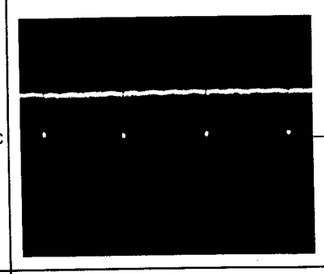
⑰ MDS 2V/div. 50μs/div.
SEARCH



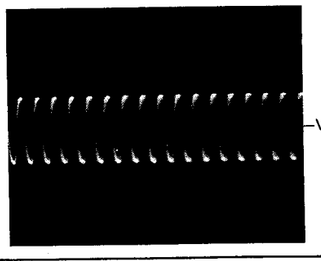
⑲ GFS 2V/div. 20ms/div.
SEARCH

⑮ SPDLO 2V/div. 50ms/div.
SEARCH

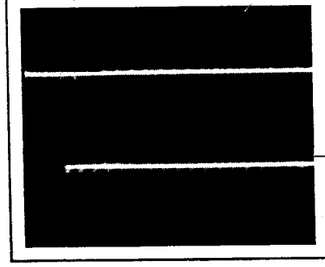
⑱ MDP 2V/div. 200μs/div.
PLAY



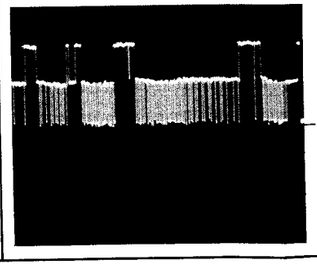
⑳ VCOO 2V/div. 0.2μs/div.
PLAY



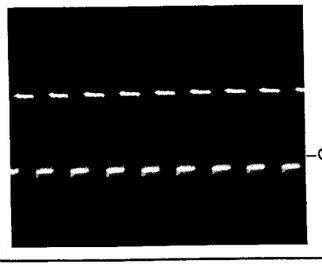
⑯ EFM 2V/div. 0.5μs/div.
PLAY



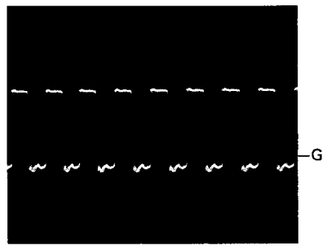
⑱ MDP 2V/div. 10ms/div.
SEARCH



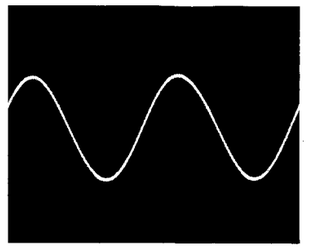
㉑ PLCK 2V/div. 0.2μs/div.
PLAY



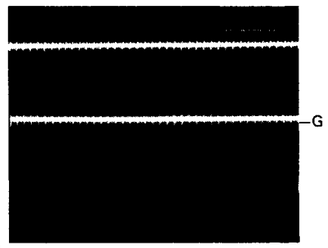
㉒ BCLK 2V/div. 0.2μs/div.



㉕ L or R L.P.F. 0.5V/div. 0.2ms/div. PLAY (1kHz: FS)

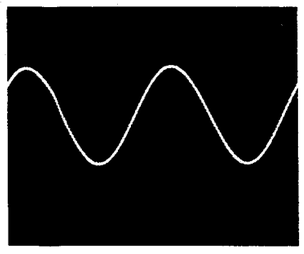


㉖ DATA 2V/div. 0.2μs/div.



㉓ LRCK 2V/div. 5μs/div. PLAY

㉔ L or R OUT 0.5V/div. 0.2ms/div. PLAY (1kHz: FS)



8. CHASSIS EXPLODED VIEW

NOTE:

- *For your parts Stock Control, the fast moving items are indicated with the marks ★★ and ★.*
  ★★: GENERALLY MOVES FASTER THAN ★.
  This classification shall be adjusted by each distributor because it depends on model number, temperature, humidity, etc.
- *Parts whose parts numbers are omitted are subject to being not supplied.*
- *Parts marked by "◉" are not always kept in stock. Their delivery time may be longer than usual or they may be unavailable.*

• Parts List

Mark	No.	Part No.	Description
	1		Sheet
	2	CBH1096	Spring
	3	CXA2104	Grille Unit
	4	SMZ40H160FZK	Screw
	5		Cushion
	6		Spacer
	7		Arm
	8	CBH1097	Spring
★	9	CAC1433	Button
	10	CNS1491	Grille
	11		Lever
	12		Holder
	13	BPZ26P080FMC	Screw
	14		Packing
	15	BMZ30P040FZK	Screw
	16	CNM1658	Packing
	17	CNV1617	Cover
	18	PMS30P060FZK	Screw
	19		Case
	20		Insulator
	21	PMS26P040FMC	Screw
	22	BMZ26P060FMC	Screw
	23		Holder
	24	CKS1328	Connector
	25	CKS1122	Connector
	26	CKS-719	Connector
	27	CKS-721	Connector
	28		Plug
	29		Connector
◉	30	CWX1057	Main Unit
	31	BPZ20P050FMC	Screw
	32		Connector
	33		Holder
	34	CNS1338	Grille
	35		Insulator
	36	CNV1567	Collar
	37	CBA1065	Screw
	38	CNV1565	Damper
	39	CBH1099	Spring
	40		Bracket
	41	HEF-102	Clamper
	42	BMZ26P040FMC	Screw
	43	BMZ40P200FRD	Screw
	44		Spacer
	45		Chassis
	46		Plug
	47		Plug
	48		Plug
	49		Bracket
	50		Connector
	51		Connector
◉	52	CWR1007	Power Supply Unit
	53	CNP1435	P.C.Board
	54	CKP1003	Socket
	55	CNT1018	Spacer
	56	CNT1019	Spacer
	57	BMZ20P040FMC	Screw
	58	CLA1321	Collar
	59	CBA1078	Screw
	60	BMZ50P300FRD	Screw
	61		Cover
	62	PMS20P025FMC	Screw
	63	CBA1081	Screw
	64	CNV1203	Clamper

• **Chassis**

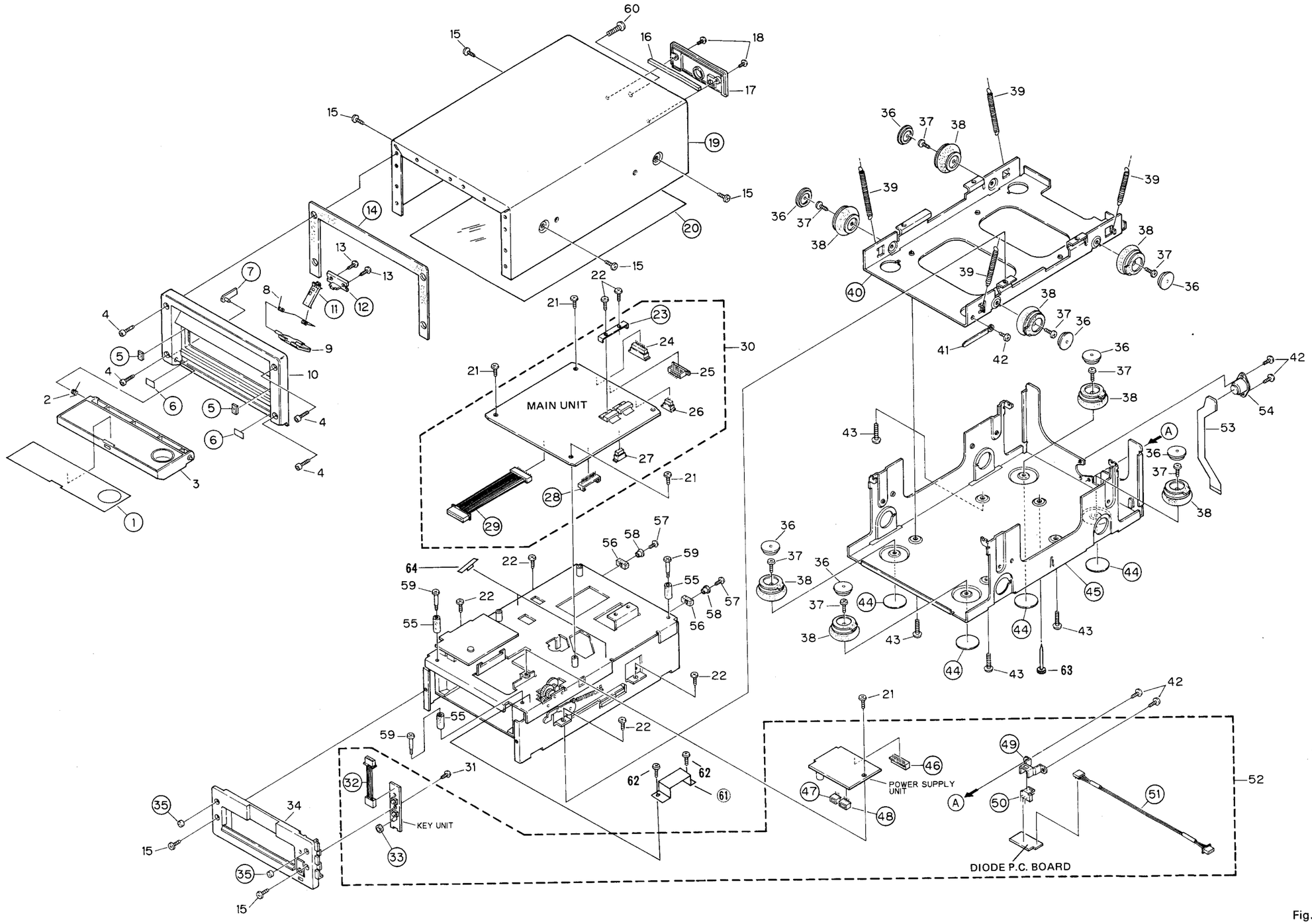


Fig. 80

9. CD MECHANISM UNIT (1) EXPLODED VIEW

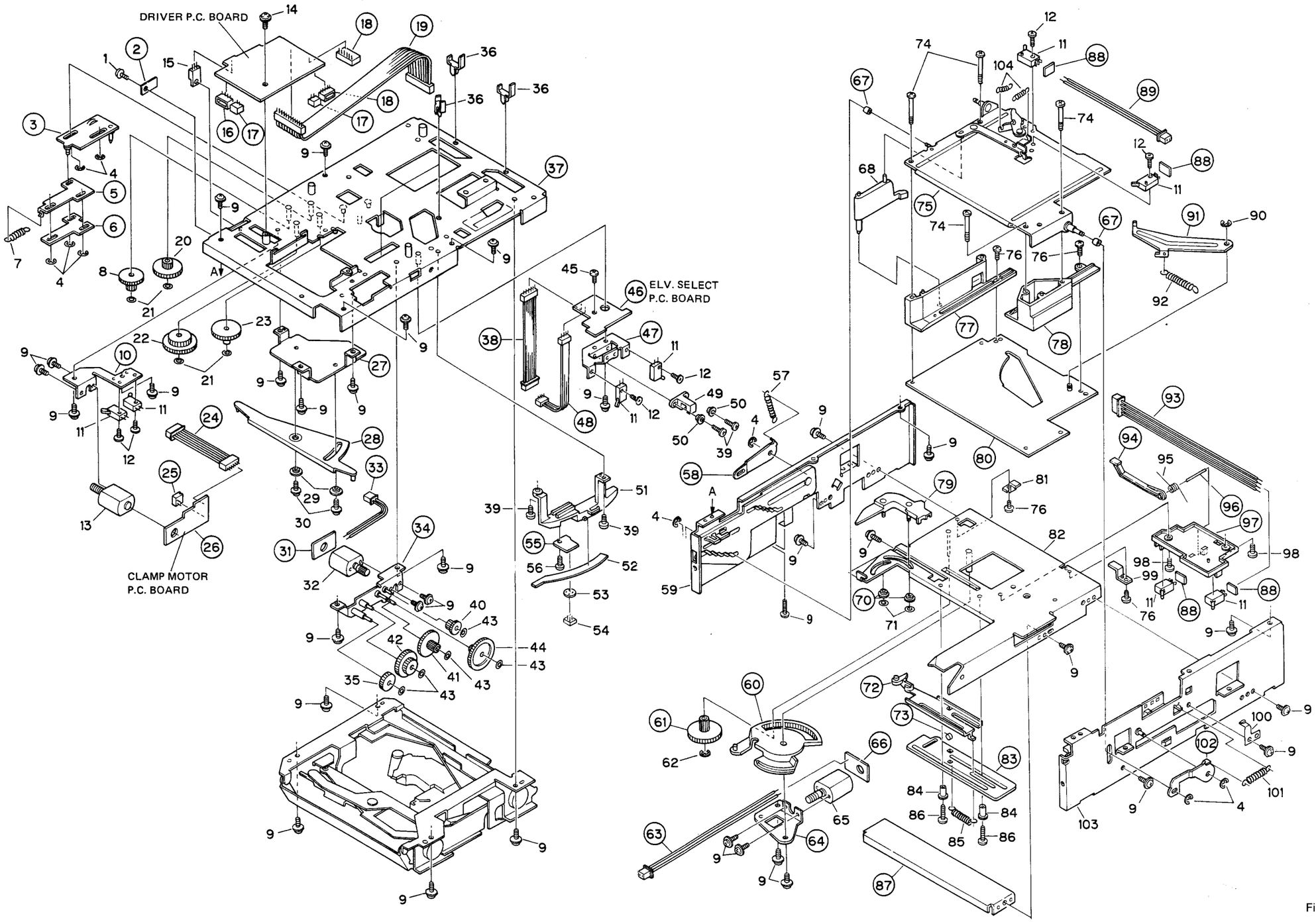


Fig. 81

• **Parts List**

Mark	No.	Part No.	Description
	1	BMZ20P030FMC	Screw
	2		Holder
	3		Buffer Unit
	4	YE15FUC	Washer
	5		Lever
	6		Lever
	7	CBH1124	Spring
	8	CNV1533	Gear
	9	PMS20P025FMC	Screw
	10		Bracket
★★	11	CSN-094	Switch
	12	CBA1025	Screw
★★	13	CXA2147	Motor Unit(CLAMP)
	14	PMS26P040FMC	Screw
★★	15	2SD1273A	Transistor
	16		Plug
	17		Plug
	18		Plug
	19		Connector
	20	CNV1528	Gear
	21	CBF1024	Washer
	22	CNV1526	Gear
	23	CNV1527	Gear
	24		Connector
	25		Connector
	26		P.C.Board
	27		Bracket
	28		Arm Unit
	29	CLA1037	Collar
	30	CBA1026	Screw
	31		P.C.Board
★★	32	CXA2145	Motor Unit(ELV)
	33		Connector
	34		Bracket Unit
	35	CNV1540	Gear
	36	CNV1558	Holder
	37		Chassis Unit
	38		Connector
	39	CBA1080	Screw
	40	CNV1539	Gear
	41	CNV1537	Gear
	42	CNV1536	Gear
	43	CBF-046	Washer
	44	CNV1538	Gear
	45	CBA1037	Screw
	46		P.C.Board
	47		Bracket
	48		Connector
	49	ON1113	Photo-Interrupter
	50	CNV1562	Bush
	51	CNV1543	Guide
	52	CNM1675	Sheet
	53	CNY-199	Spacer
	54	ON2160	Photo-Interrupter
	55		P.C.Board
	56	PBZ20P060FMC	Screw
	57	CBH1126	Spring
	58		Arm
	59	CXA1875	Side Frame Unit
	60		Arm Gear
	61		Gear
	62	YE20FUC	Washer
	63		Connector
	64		Bracket
★★	65	CXA2146	Motor Unit(TRAY)
	66		Bracket
	67		Roller
	68	CNV1549	Arm
	69	·····	
	70		Roller
	71	YE12FUC	Washer
	72		Slide Plate
	73		Roller
	74	CBA1063	Screw
	75		Holder Unit
	76	CBA1037	Screw
	77		Guide
	78		Guide
	79		Arm
	80		Holder Unit
	81	CNV1554	Guide
	82	CXA1877	Sub Chassis Unit
	83		Slide Plate
	84	CLA1263	Collar
	85	CBH1128	Spring
	86	BMZ20P080FMC	Screw
	87		Bracket
	88		P.C.Board
	89		Connector
	90	YE20FUC	Washer
	91		Arm
	92	CBH1115	Spring
	93		Connector
	94		Arm
	95	CBH1127	Spring
	96		Shaft
	97		Bracket
	98	CBA1080	Screw
	99	CNV1555	Guide
	100	CBL1044	Spring
	101	CBH1126	Spring
	102		Arm
	103	CXA1876	Side Frame Unit
	104	CBH1114	Spring

10. CD MECHANISM UNIT (2) EXPLODED VIEW

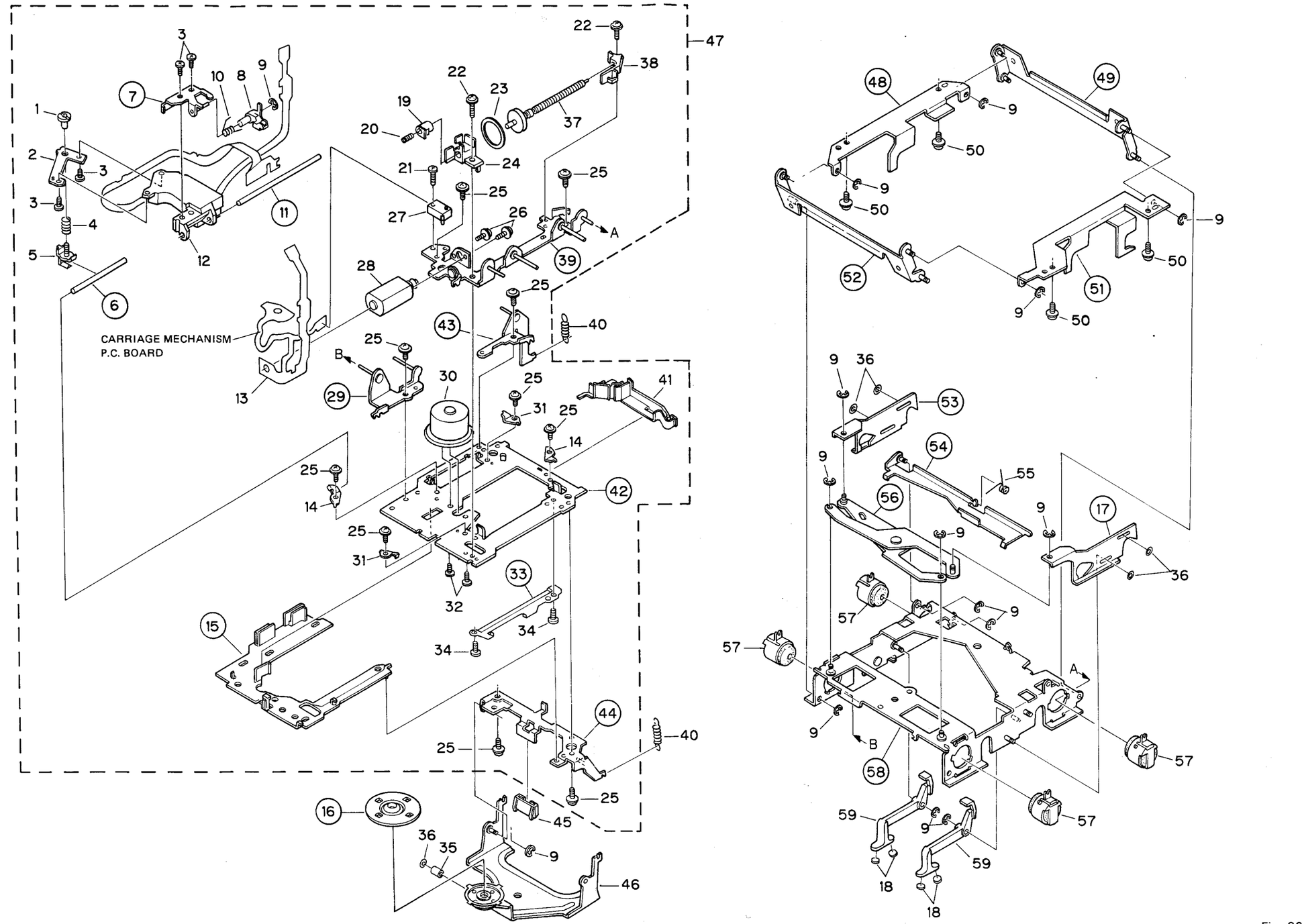


Fig. 82

• **Parts List**

Mark	No.	Part No.	Description
	1	CLA1319	Screw
	2	CNC1736	Holder
	3	CBA1062	Screw
	4	CBH1105	Spring
	5	CNV1512	Holder
	6		Shaft
	7		Holder Unit
	8	CNV1513	Luck
	9	YE15FUC	Washer
	10	CBH1106	Spring
	11		Shaft
	12	CGY1006	Pickup Unit
	13	CNP1612	P.C.Board
	14	CNC1739	Holder
	15		Cover
	16		Guide
	17		Slide Plate
	18	CNM1676	Sheat
	19	CNV1509	Spacer
	20	CBH1104	Spring
	21	CBA1070	Screw
	22	PMS20P050FMC	Screw
★	23	CNT1020	Belt
	24	CNV1510	Holder
	25	PMS20P030FMC	Screw
	26	CBA-098	Screw
★★	27	CSN-094	Switch
★★	28	CXA2133	Motor Unit(Carriage)
	29		Bracket Unit
★★	30	CXM1018	Motor Unit(Spindle)

Mark	No.	Part No.	Description
	31	CNC1738	Holder
	32	HBA-163	Screw
	33		Cover
	34	CBA1061	Screw
	35	CNV1559	Roller
	36	CBF-046	Washer
	37	CXA1861	Screw Unit
	38	CNV1511	Holder
	39		Bracket Unit
	40	CBH1117	Spring
	41	CNV1515	Holder
	42		Chassis
	43		Bracket Unit
	44		Bracket Unit
	45	CNV1516	Guide
	46	CXA2149	Arm Unit
◉	47	CXA1855	Carriage Mechanism Unit
	48		Bracket
	49		Arm Unit
	50	PMS20P025FMC	Screw
	51		Bracket
	52		Arm Unit
	53		Slide Plate
	54		Arm Unit
	55	CBH1125	Spring
	56		Arm Unit
	57	CXA2139	Damper Unit
	58		Holder Unit
	59	CNV1544	Guide

11. ELECTRICAL PARTS LIST

NOTE:

- *For your parts Stock Control, the fast moving items are indicated with the marks ‡‡ and ‡.*
  ‡‡ : GENERALLY MOVES FASTER THAN ‡.
  This classification shall be adjusted by each distributor because it depends on model number, temperature, humidity, etc.
- *Parts whose parts numbers are omitted are subject to being not supplied.*
- *The part numbers shown below indicate chip components.*
  Chip Resistor
  RS1/8S□□□J, RS1/10S□□□J
  Chip Capacitor (except for CQS.....)
  CKS....., CCS....., CSZS.....

Unit Number :
Unit Name : Power Supply Unit

MISCELLANEOUS

Mark	Circuit Symbol & No.	Part Name	Part No.
‡‡	IC 951		KHA1001
‡‡	Q 951		2SD1859
‡‡	Q 952		DTA124ES
‡‡	Q 953		DTC124ES
‡	D 951 953 954		ERA15-02VH
‡	D 952		RD9R1JSB2
‡	D 955		1S2473VH
	L 951	Choke Coil	CTF-002
	RY 951	Relay	CSR1006

RESISTORS

Mark	Circuit Symbol & No.	Part Name	Part No.
	R 951		RD1/4VM102J
	R 952		RD1/2PS821JL
	R 953		RD1/4VM103J

CAPACITORS

Mark	Circuit Symbol & No.	Part Name	Part No.
	C 951 957		CEA471M16L2
	C 952		CCG-105
	C 953 956 959		CKCYF473Z50
	C 954		CEA010M50LL
	C 955		CEA220M10L2
	C 958		CEAUH221M10

Unit Number :
Unit Name : Diode P.C.Board

Mark	Circuit Symbol & No.	Part Name	Part No.
	ZNR951	Serge Absorber	ERZ-C07DK220

Unit Number :
Unit Name : Key Unit

Mark	Circuit Symbol & No.	Part Name	Part No.
‡	D 901	LED	AA3423S
‡‡	S 901 902	Switch	CSG1004

Unit Number :
Unit Name : Main Unit

MISCELLANEOUS

Mark	Circuit Symbol & No.	Part Name	Part No.
‡‡	IC 351		CXA1081M
‡‡	IC 601		CXA1082AQ
‡‡	IC 651 652		PA3021B
‡‡	IC 653		μPC358G
‡‡	IC 654 655 657 658		M5218FP
‡‡	IC 656		M5233FP
‡‡	IC 701		CXD1135Q
‡‡	IC 702 755		CXK5816M-15L
‡‡	IC 703		μPD6355G
‡‡	IC 704		KHA221A
‡‡	IC 751		PD4121B
‡‡	IC 752		M51945AFP
‡‡	IC 753		M51955AFP
‡‡	IC 754		TC40H164F
‡‡	Q 351		2SB1243
‡‡	Q 601 703 704	Chip Transistor	2SD1048
‡‡	Q 651 652 653 701 705 751	Chip Transistor	UN2211
‡‡	Q 702 706	Chip Transistor	UN2111
‡‡	Q 752		2SC3474
‡	D 651 752		ERA15-02VH
‡	D 652 653 654 655 656 657 658 659		ERA82-004VH
‡	D 661 662		HZS2ALL
‡	D 663 751	Chip Diode	MA3200
‡	D 701	Chip Diode	MA151WA
‡	D 753		HZ6LB1
‡	D 754 755 756 757 758	Chip Diode	MA153
‡	D 759	Chip Diode	MA151K
	TH 751	Thermister	CCX-021
	X 701	Xtal Resonator	CSS1009
	X 751	Ceramic Resonator	CSS-042
‡‡	VR 351	Semi-fixed 47kΩ(B)×4	CCP1006
‡‡	VR 601	Semi-fixed 47kΩ(B), 10kΩ(B)×2	CCP1005
‡‡	VR 604	Semi-fixed 2.2kΩ(B)	HCP-267
‡‡	VR 651	Semi-fixed 47kΩ(B)	HCP-275
	L 651	Coil	CTH1035

RESISTORS

Mark	Circuit Symbol & No.	Part Name	Part No.
	R 351		RS1/2P220JL
	R 353 631		RS1/10S272J
	R 354 363 378 616 628 768		RS1/10S223J
	R 355 610 625		RS1/10S113J
	R 356 357 358 359 669 694		RS1/10S563J
	R 360 361		RS1/10S124J
	R 362 781 793 794 795 798		RS1/10S564J
	R 364 365 618 671 685 695		RS1/10S105J
	R 366 377 666		RS1/10S562J
	R 367 609 614 619 627 758		RS1/10S104J
	R 379 667 686 710 711 717		RS1/10S472J
	R 380 617 681 682		RS1/10S203J
	R 381 708 709 714 783		RS1/10S102J
	R 601 602 676 677 683 690		RS1/10S101J
	R 606		RS1/10S224J
	R 607		RS1/10S683J
	R 608		RS1/10S823J
	R 611		RS1/10S432J
	R 612		RS1/10S623J
	R 613		RS1/10S754J
	R 620 674 716		RS1/10S332J
	R 621 751		RS1/10S184J
	R 622 651 652 653 654 655 656 657 658 659		RS1/10S103J
	R 623 624		RS1/10S393J
	R 629 630		RS1/10S273J
	R 660 661 662 663 664 670 687 688		RS1/10S103J
	R 665		RS1/10S821J
	R 668 712 713		RS1/10S392J
	R 672		RS1/10S364J
	R 673 760 764 766 769 772 777 786		RS1/10S473J
	R 675		RS1/10S682J
	R 678		RS1/10S223J
	R 679		RS1/10S392J
	R 680		RS1P1R5JL
	R 684		RS1/10S472J
	R 689 691 696 697 703 715 718 719 755		RS1/10S103J
	R 692		RS1/10S105J
	R 693		RD1/4PS222JL
	R 701		RS1/10S100J
	R 721		RS1/10S4R7J
	R 752		RS1/10S363J
	R 753		RS1/10S153J
	R 754		RS1/10S822J
	R 756 770 771 779 780		RS1/10S681J
	R 757 759 761 762 763 765 767 773 787		RS1/10S222J
	R 775 796		RS1/10S333J
	R 776		RS1/10S683J
	R 782 784 788		RS1/10S104J

CAPACITORS

Mark	Circuit Symbol & No.	Part Name	Part No.
	C 351 719 720 753		CEA101M6R3LL
	C 352 355 371 611 625 626 655 657 659 660		CKSQYB103K50
	C 353 613 622 666		CKSYB333K25
	C 354 357		CSYA330M6R30S
	C 356		CKSYB332K50
	C 359 614		CEAR47M50LL
	C 360 361 674 705 716		CSYA100M6R30S
	C 370 703 704		CCSQCH220J50
	C 372		CCSQCH100D50
	C 373		CCSQCH220J50
	C 601 654 658		CKSQYB222K50
	C 602 603 607 612 653 656 673 708 709		CEA100M16LL
	C 605 620		CEA0R1M50NPLL
	C 606		CEA220M6R3LL
	C 608		CEA220M10NPLL
	C 609 760		CKSQYB472K50
	C 610 619		CCSQCH221J50
	C 615 759		CKSQYB102K50
	C 616		CEA220M6R3LL
	C 617		CEA4R7M35LL
	C 618		CKSQYB822K50
	C 621		CEA4R7M16NPLL
	C 623		CKSQYB272K50
	C 624		CCSQCH221J50
	C 627		CCSQCH220J50
	C 651 670		CKSYF224Z25
	C 652	1000μF/16V	CCH1003
	C 661 663		CEA010M50NPLL
	C 662 664 727 758 761		CKSQYB103K50
	C 665		CEAR22M50NPLL
	C 667 668 669 713 714 721 724 752 756 757		CKSQYB103K50
	C 671 672		CSZAR68M35L
	C 675 676		CEA2R2M50LL
	C 677 679		CCSQSL681J50
	C 678		CKSYB473K25
	C 680		CKDYB681K50
	C 701 710 712 725 726		CSYA6R8M6R30S
	C 702		CSYA220M6R30S
	C 706 707		CCSQCH470J50
	C 717 718		CEA470M6R3LL
	C 722 723		CEA330M6R3LL
	C 751	2200μF/16V	CCH-123
	C 754 755		CCSQCH300J50

	CDX-M100/UC ~000581	CDX-M100/UC 000582~	CDX-M100/EW 000001~
C373	CCDCH220J50	CCSQCH220J50	CCSQCH220J50
C666	CQFA333J50L	CKSYB333K25	CKSYB333K25

Unit Number :
Unit Name : Carriage Mechanism P.C.Board

Mark	Circuit Symbol & No.	Part Name	Part No.
##	M 831	Motor Unit(Spindle)	CXM1018
##	M 832	Motor Unit(Carriage)	CXA2133
##	S 831	Switch(Home)	CSN-094

Unit Number :
Unit Name : Clamp Motor P.C.Board

Mark	Circuit Symbol & No.	Part Name	Part No.
##	M 803	Motor Unit (Clamp)	CXA2147
##	S 801 803	Switch(End, Float)	CSN1004

CDX-M100

Unit Number :
Unit Name : ELV. Select P.C.Board

Mark	Circuit Symbol & No.	Part Name	Part No.
##	S 806 807	Switch(STBY, EJP)	CSN1004
	P 801	Photo-Interrupter	ON1113

Unit Number :
Unit Name : Tray Select P.C.Board

Mark	Circuit Symbol & No.	Part Name	Part No.
	P 802	Photo-Interrupter	ON2160

Unit Number :
Unit Name : Driver P.C.Board

MISCELLANEOUS

Mark	Circuit Symbol & No.	Part Name	Part No.
##	IC 801		BA6238A
##	IC 802		TC4025BP
##	IC 803		BA6209
##	Q 801		2SD1273A
##	Q 802		DTA124EL
##	Q 803 804		DTC124EL
#	D 801		RD11JSB1
#	D 802		RD5R1EB2
##	VR 801	Semi-fixed 22kΩ(B)	VRTB6VS223

RESISTORS

Mark	Circuit Symbol & No.	Part Name	Part No.
	R 801		RD1/4PS821JL
	R 802		RD1/4PS331JL
	R 803 804 805		RD1/4PS222JL
	R 806 807 808		RD1/4PS470JL
	R 809		RD1/4PS622JL
	R810		RD1/4PS681JL
	R811		RD1/4PS471JL
	R812		RD1/4PS222JL

CAPACITORS

Mark	Circuit Symbol & No.	Part Name	Part No.
	C 801		CSYA220M100S
	C 802		CGDYX104M25
	C 803		CKDYB103K50

Miscellaneous Parts List

Mark	Circuit Symbol & No.	Part Name	Part No.
		Pick Up Unit	CGY1006
##	M 801	Motor Unit(Tray)	CXA2146
##	M 802	Motor Unit(ELV.)	CXA2145
##	S 802 804 805 808	Switch (MAG-1, MAG-2, TOUT, TIN)	CSN1004

12. PACKING METHOD

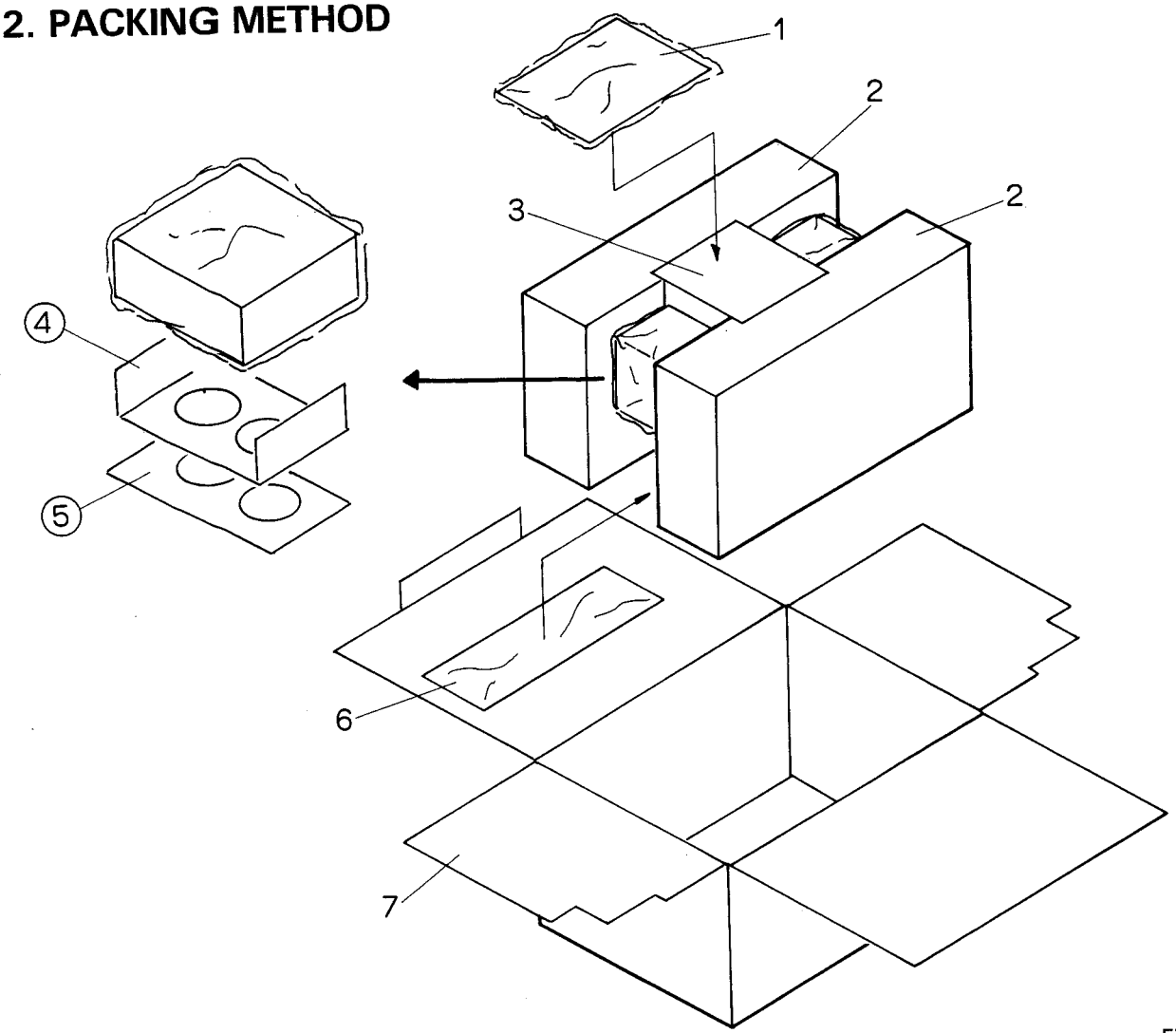


Fig. 83

• **Parts List**

Mark	No.	Part No.	Description
	1	CRD1115	Owner's Manual (UC)
		CRD1116	Owner's Manual (EW)
			Card
			Cushion
	2	CHP1116	Styrofoam
	3	PXA1104	Magazine (UC)
		PXA1050	Magazine (EW)
	4		Angle
	5		Base
	6	CEA1303	Accessory Assy (UC)
		CEA1311	Accessory Assy (EW)

Mark	No.	Part No.	Description
	6-1	CDE1789	Cord (13P) (UC)
		CDE1865	Cord (13P) (EW)
	6-2	CDE1790	Cord (1P)
	6-3	CDE1791	Cord (2P)
	6-4	CEA1255	Screw Assy
	6-4-1	CBA1069	Screw
	6-4-2	HMB60P500FZK	Screw
	6-4-3	HMF40P080FZK	Screw
	6-4-4	NF60FZK	Nut
	6-4-5	NR60FMC	Nut
	7	CHG1418	Carton (UC)
		CHG1419	Carton (EW)

13. NAME OF PARTS AND THEIR FUNCTIONS

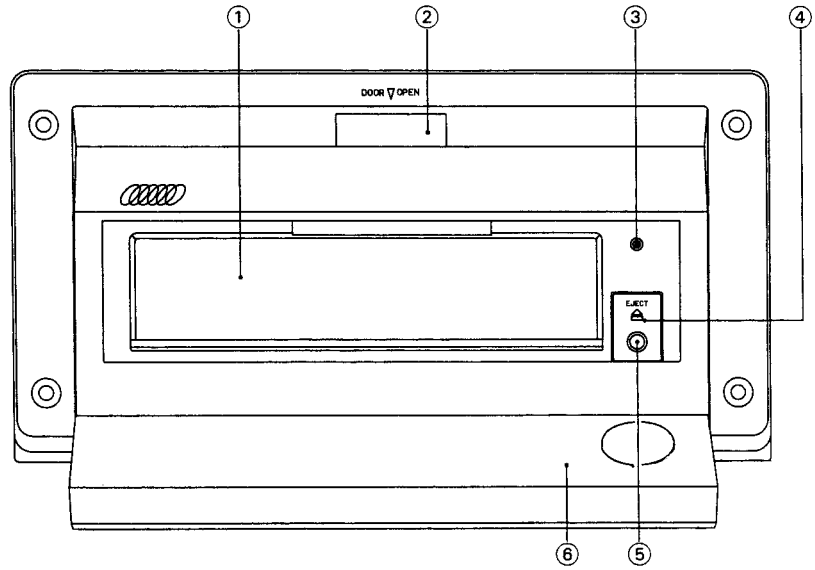


Fig. 84

① **Compact disc magazine insertion hole**
② **Door open button**
Pressing this button opens the door ⑥.
③ **Clear button**
If the power will not come on, or the compact disc player will not operate when the button on the compact disc controller is pressed, or if the compact disc controller display is incorrect, press this button on the player with the tip of a pencil to restore normal operation. Always press the clear button on the compact disc controller, too, after pressing this button.
④ **Eject button**
Pressing this button ejects the magazine.
⑤ **Power indicator**
This lamp comes on when the power is turned on.
⑥ **Door**
Be sure never to leave the door open.

14. CONNECTION

- Be sure to connect the ground lead (black) to the vehicle body or some other metal part. If the ground lead is not properly connected, noise may occur or the player or compact disc controller may not operate correctly.

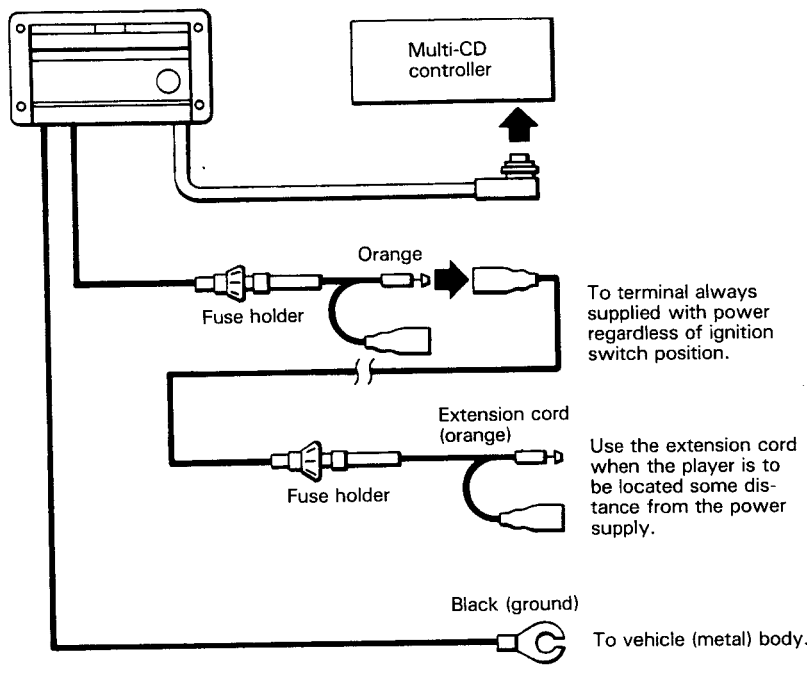

Multi-CD controller
Orange
Fuse holder
To terminal always supplied with power regardless of ignition switch position.
Extension cord (orange)
Fuse holder
Use the extension cord when the player is to be located some distance from the power supply.
Black (ground)
To vehicle (metal) body.

Fig. 85